THE NAVAL ANNUAL

Edited by T. A. BRASSEY

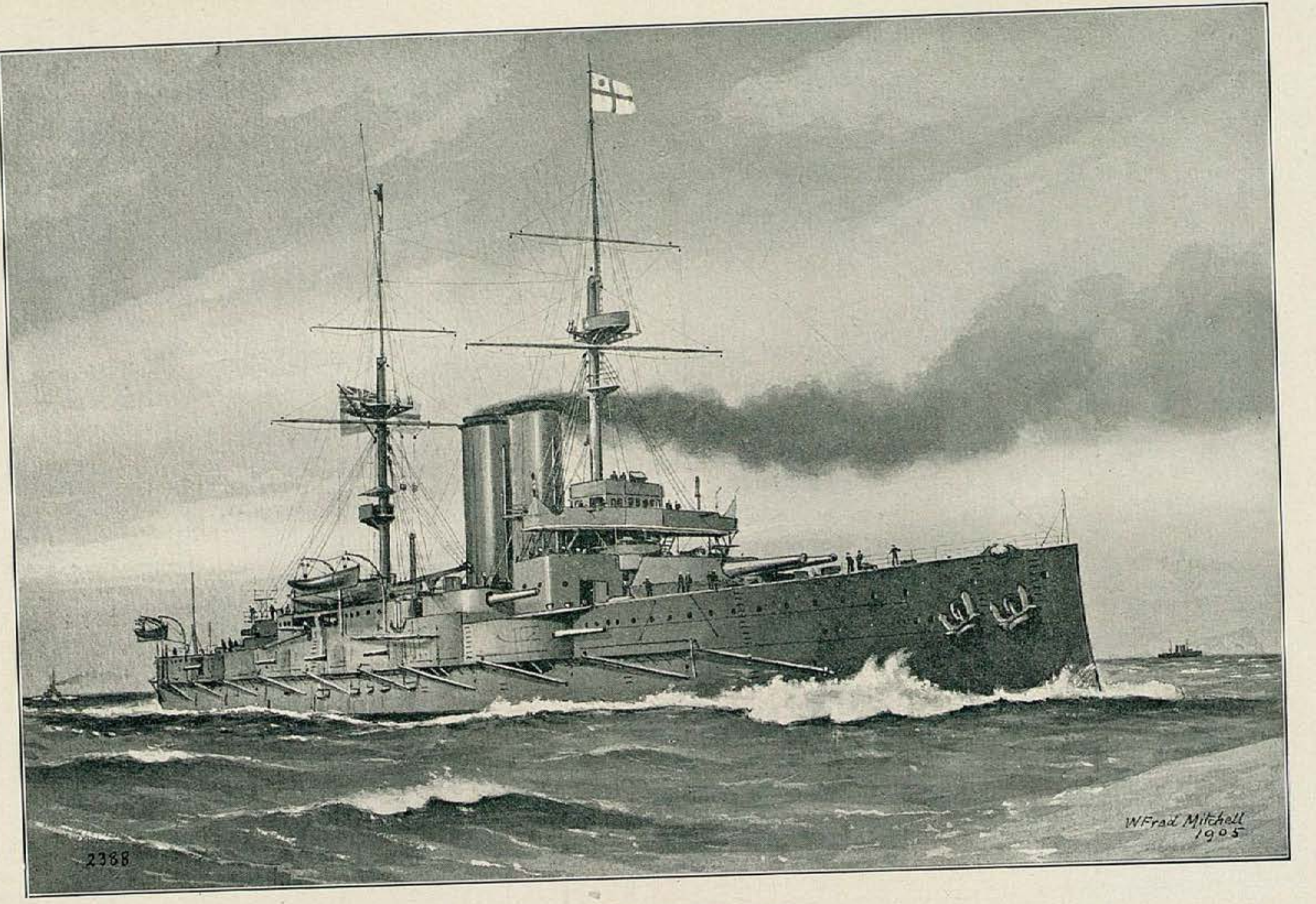


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H.M.S. "KING EDWARD VII."

THE

NAVAL ANNUAL, 1905.

EDITED BY

T. A. BRASSEY, A.I.N.A.

PART I.—Lord BRASSEY, K.C.B.; Admiral Sir CYPRIAN BRIDGE, K.C.B.; Vice-Admiral Sir REGINALD CUSTANCE, K.C.B.; Messrs. J. L. BASHFORD, JOHN LEYLAND, J. R. THURSFIELD, and the EDITOR.

PART II.—List of Ships: Commander C. N. ROBINSON, R.N., and JOHN LEYLAND; Plates: S. W. BARNABY.

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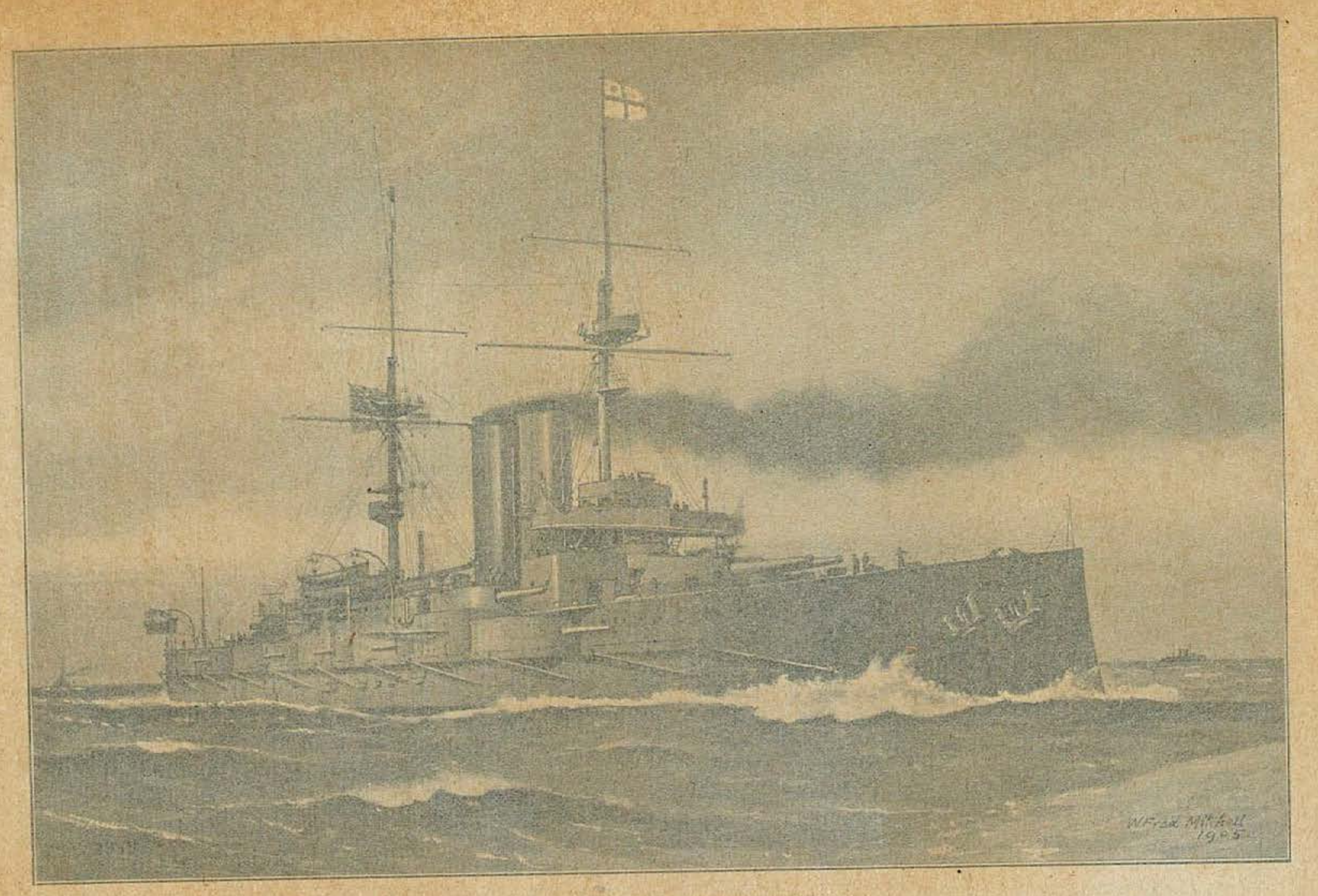
PART IV.—FIRST LORD'S MEMORANDUM; BRITISH AND FOREIGN ESTIMATES.

1905

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PREFACE.

OWING to the Russo-Japanese war the history of the past year will probably prove more interesting to naval men than that of any year since the *Naval Annual* was first published. In the wars between China and Japan and between the United States and Spain the combatants were most unequally matched. The battle off the Yalu, and the destruction of Admiral Cervera's Squadron off Santiago, cannot be compared with the engagements between the Port Arthur Squadron and the Japanese Fleet on August 10, when fleets of modern battleships of not unequal strength were for the first time engaged. Admiral Sir Cyprian Bridge draws some lessons from the war, which demand the serious consideration of the Naval Constructor and Naval Administration, and which are likely to have considerable influence on future naval policy. We gave last year an account of the Japanese Navy. This year we have an interesting description of the German Navy, prepared by Mr. Bashford. Vice-Admiral Sir Reginald Custance, formerly Director of Naval Intelligence, contributes an article on Tactics, which, we hope, will lead to further study of this important subject among naval officers, for whose benefit the *Naval Annual* was founded.

It has been suggested that the *Naval Annual* would be of more value to some of its readers if the Reports of the Committee on the French Estimates, that of the Secretary of the United States Navy, and other official documents were included. The length of these Reports renders this course impossible, but we have endeavoured to partially meet this suggestion by summarising the Report of M. Bos, and by giving extracts from the Reports of the United States Navy Board, etc. There is so much of importance to record in the history of the British Navy during the past year that it appeared desirable to again devote a special chapter to this subject. Many of the reforms introduced have been suggested in the *Naval Annual* or by its founder. This is especially the case with the new scheme of Redistribution, which, with one important exception, is nearly an exact

reproduction of that suggested by Lord Brassey in a letter to the *Times* in 1901 (reprinted in Part IV).

Lord Selborne has done much to improve the efficiency of the Navy, though some of the changes recently made in Admiralty administration appear open to serious criticism. Under his administration there has been a great increase in all branches of the Naval Reserves, but the large accumulations of men in the Home ports, and the present condition of the manning of the Mercantile Marine (it is now manned to the extent of 46·1 per cent. by foreigners and Lascars), render it impossible to rest on our oars. The present strength of our Permanent Force is excessive, and the attention of the Government and the country must be directed to the further development of Reserves in the Mercantile Marine. This all-important subject is dealt with by Lord Brassey.

Part II. remains, as before, in the hands of Commander Robinson and Mr. Leyland.

It has been a task of great difficulty to fill the place of the able writer who has for the last few years been responsible for the chapter on Armour and Ordnance, and whose untimely death is so widely deplored. The most competent naval officers are fully employed, and are therefore unavailable. Captain Tresidder has been kind enough to undertake to deal with Armour, a subject which he treats from a different point of view to his predecessors, but, possibly, not the less interesting on that account to readers of the *Naval Annual*.

In the work of checking and collating the various parts of the volume, we have had the assistance of Major Ruggles-Brise. This work has been more than usually troublesome on the present occasion owing to the lists of Foreign Navies given in two of the chapters. We have to thank several correspondents for pointing out errors in the last volume. We hope that their kindness will be continued to an increasing extent as regards the *Naval Annual* of 1905.

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PART I.

CHAPTER I.

The British Navy.

Lord Selborne's administration.

Lord Selborne has resigned his position as First Lord of the Admiralty in order to undertake the difficult duties of High Commissioner in South Africa on Lord Milner's retirement. No statesman whose public action was not governed by the most patriotic motives would have made the sacrifice which is being made by Lord Selborne. During the years that he has presided over the Navy many changes have taken place—the result of a gradual process of evolution, the foundations of which he generously attributes to his predecessors, Lord Goschen, Lord Spencer, and Lord George Hamilton. Some of the changes made during the last few months are open to serious objection, but Lord Selborne undoubtedly leaves the Navy in many respects more efficient for the purposes of war than it was when he entered upon the duties of his office. The development of Naval Reserves, the greater attention given to, and consequent improvement in, gunnery, the new system of entry for officers, and, as regards *matériel*, the establishment of the Fleet in Commission in Reserve, and the improved state of repair of ships still on the effective list, are amongst the principal features of Lord Selborne's administration.

Battleships.

Four of the eight battleships of the King Edward VII class have passed through their trials, with the following results, as given in *Engineering*:—

	Makers of Machinery.	At one-fifth Power.			At four-fifths Power.			Full Power.		
		Speed.	I.H.P.	Coal.	Speed.	I.H.P.	Coal.	Speed.	I.H.P	Coal.
		knots.		lbs.	knots.		lbs.	knots.		lbs.
King Edward VII . .	Harland & Wolff .	11·6*	3,760	2·63	17·35	12,884	1·96	19·04	18,138	2·17
Dominion . .	Barrow .	12·8*	3,889	1·93	18·3*	12,843	1·68	19·5	18,438	1·77
Commonwealth	Fairfield .	11*	3,644	1·74	17·9	12,769	1·68	19·01	18,538	1·83
Hindustan .	Clydebank	11·8*	3,718	1·94	17·7	12,926	1·76	19·01	18,521	1·8

* By Log.

The designed speed of the vessels of the King Edward class was 18·5 knots with 18,000 I.H.P. All have four-fifths Babcock & Wilcox boilers. The King Edward has been commissioned; the Commonwealth will be completed by the end of the financial year, and the Dominion early in 1905–6. The New Zealand is completing at Portsmouth. The Britannia, laid down at Portsmouth on February 4, 1904, was launched on December 10, 1904. The Hibernia is building at Devonport and the Africa at Chatham.

Lord Nelson class.

The two new battleships of the Lord Nelson class provided for in last year's Estimates have been laid down. The Agamemnon is building by Messrs. Beardmore, of Glasgow, and the Lord Nelson by the Palmer Shipbuilding Company, of Jarrow. Displacement at load draught, 16,500 tons; length, 410 ft.; beam, 79 ft. 6 in.; mean draught, 27 ft. The estimated speed is 18 knots with 16,750 H.P., to be obtained under natural draught in the case of the Lord Nelson and under forced draught in that of the Agamemnon. The engines of the former are being made by Palmer's Shipbuilding Co., those of the latter by Hawthorn, Leslie & Co. In offensive and defensive power these ships represent a considerable advance on their predecessors. The armament comprises four 12-in. and ten 9·2-in. guns, as compared with four 12-in., four 9·2-in., and ten 6-in. guns in the King Edward. The maximum thickness of the belt armour is 12 in. in the Lord Nelson, as compared with 9 in. in the King Edward. One battleship, to be named the Dreadnought, is to be laid down at Portsmouth in 1905–6.

Dimensions of battleships.

The United States, in the Connecticut class, and the Japanese, in the Katori and Kashima, are building battleships of approximately the same dimensions as the Lord Nelson. In view of the losses which both sides have suffered during the war in the East from submarine mines, the policy of putting so many eggs in one basket demands serious reconsideration. A Lord Nelson or Connecticut costs in round figures £1,500,000, a Swiftsure or Vittorio Emmanuele costs about £1,000,000. For the same expenditure two of the former and three of the latter can be built. In offensive qualities the advantage is on the side of the latter, for the more numerous fleet has its gun positions more widely distributed, and has greater power of concentrating its fire. The defensive qualities of the larger ships will be superior to those of the smaller, ship for ship, but if some sacrifice is accepted in speed—and in the Idaho and Mississippi the United States Navy have done this—the defensive qualities of the smaller ships can be made equal to those of the larger. Sir Cyprian Bridge, in his comments on the Russo-Japanese war, holds that the tactical value of speed has not been established. A further important consideration is

that for operations in the North Sea and the Baltic battleships of lighter draught than those we are now building will certainly be required.

Armoured cruisers. Kent class.

We published last year the results of the trials of nine of the Kent class. Since the alteration in their propellers these vessels have exceeded the designed speed by over half a knot. The Kent actually attained a speed of 24 knots, and the Suffolk a speed of 24·7 knots on trial, while the Monmouth on service averaged 20½ knots for the whole distance from Gibraltar to Plymouth. The following are the results of the trials of the Cornwall, the tenth ship of the class:—

	Speed.	I.H.P.	Coal.
At one-fifth power . . .	15·3	4,800	1·73
At four-fifths power . . .	21·835	16,487	1·69
Full power	23·689	29,699	1·94

The whole of this class are now in commission.

Devonshire class.

The Devonshire class (10,850 tons) comprises six vessels. Three were launched in 1903–4, while the Devonshire was launched at Chatham on April 30, 1904. The completion of this class has been delayed owing to the substitution of two 7·5-in. guns on the upper deck for four 6-in. guns carried in superimposed casemates.

The following are the results of the trials of the Carnarvon and Devonshire:—

	Makers of Machinery.	At one-fifth Power.			At four-fifths Power.			Full Power.		
		Speed.	I.H.P.	Coal.	Speed.	I.H.P.	Coal.	Speed.	I.H.P.	Coal.
		knots.		lbs.	knots.		lbs.	knots.		lbs.
Carnarvon .	Humphreys	14·3	4,756	2·11	21·43	15,212	1·78	23·3	21,489	2·29
Devonshire .	Thames Ironworks	13·07	4,533	2·05	21·	14,830	2·02	22·97	21,475	1·79

Both the Carnarvon and Devonshire are fitted with Niclausse and cylindrical boilers. In this connection it should be noted that the practice of putting water-tube and cylindrical boilers in the same ship is to be abandoned. The trials of the Carnarvon were exceedingly satisfactory. Though she is stated in *Engineering* to have started on her full-power trial at slightly over her designed displacement, she exceeded the designed speed by over a knot. If similar results are attained by the five sister-ships, we shall have, in the Devonshire class, cruisers eminently satisfactory from the point of view of speed. Their armament, comprising only four 7·5-in. and six 6-in. guns, is extraordinarily weak for their size and cost. The Orlando class, now discarded, carried two 9·2-in. and ten 6-in. guns on a displacement of 5600 tons; the Chilian O'Higgins (8500 tons) four 8-in.

and ten 6-in. guns; the Francesco Ferruccio (7294 tons) one 10-in., two 8-in., and fourteen 6-in.; and the six Japanese cruisers Asama, etc., which are under 10,000 tons, four 8-in. and fourteen 6-in. guns. Could a Kent or Devonshire fight the Francesco Ferruccio or Asama with a fair prospect of success? If they cannot, the conclusion seems inevitable that too much has been sacrificed to speed in vessels costing over £750,000. The first purpose of a ship of war is to fight. Speed is of no value to a battleship or cruiser which cannot fight the enemy when she catches him.

Duke of Edinburgh.

Of the Duke of Edinburgh class (13,550 tons), the Duke of Edinburgh was launched on June 14th at Pembroke, and the Black Prince at the Thames Ironworks on November 8, 1904. The above ships carry an armament of six 9·2-in. guns, mounted singly in hooded barbettes, in addition to ten 6-in. guns. In the Warrior, Natal, Cochrane, and Achilles, four 7·5-in. guns are substituted for the ten 6-in. guns—a very serious reduction in the number of guns of the secondary armament. Of the large armoured cruisers building for foreign navies, the Ernest Renan carries four 7·6-in., the California four 8-in., and the Washington four 10-in. guns. The most modern armoured cruisers are practically second-class battleships, and are being worked like battleships in squadrons.

Minotaur class.

Three of the four new cruisers for which provision was made in last year's Estimates have been laid down—the Minotaur at Devonport, the Shannon at Chatham, and the Defence at Pembroke. The laying down of the Orion, the fourth cruiser of this class, has been abandoned, but four armoured cruisers, the first of which is to be named the Invincible, are to be laid down in 1905–6. The Minotaur class, which were designed by Mr. Watts, are of 14,600 tons displacement; length, 490 ft.; beam, 74 ft. 6 in.; mean draught, 26 ft.—except in the case of the Shannon, which is to draw only 25 ft., and has 1 ft. more beam than her sister-ships. The armament comprises four 9·2-in. and ten 7·5-in. guns—a considerable improvement on the armament of the Duke of Edinburgh and Warrior. The estimated speed is 23 knots, with 27,000 I.H.P., to be obtained under forced draught in the case of the Shannon and Defence, and under natural draught in the case of the Minotaur.

Voyage of Terrible.

The Terrible in 1904 made a trip to China and back, the results of which offer a remarkable contrast to those obtained on a similar voyage made in 1902:—

	Average Speed.	Knots per ton of coal.	I.H.P.	Mean Draught.
1902	11·8	1·22	5,738	26 ft. 7 in.
1904	12·6	2·34	4,692	28 ft. outwards. 26 ft. 6 in. homewards.

In 1904 there is thus an increased speed of ·8 knots, with 1044 less I.H.P., although the displacement of the ship was greater. These results are attributed to greater practice in handling water-tube boilers.

Third-class cruisers. Amethyst class.

The four third-class cruisers—Amethyst, built at Elswick; Sapphire, built at Jarrow; and Diamond and Topaze, built at Laird's—have completed their trials. The Amethyst is fitted with Parsons turbines, and has modified Yarrow boilers. The Sapphire has Reed boilers, the Diamond and Topaze Laird-Normand boilers.

	Makers of Machinery	At one-fifth Power.			At four-fifths Power.			Full Power.		
		Speed.	I.H.P.	Coal.	Speed.	I.H.P.	Coal.	Speed.	I.H.P.	Coal.
		knots.		lbs.	knots.		lbs.	knots.		lbs.
Amethyst	Parsons	18·2	4,890*	1·71	20·63	7,300*	1·5	23·42	14,200*	1·72
Sapphire .	Palmer	18·47	5,012	2·34	20·68	7,281	2·22	22·45	10,200	2·52
Diamond .	Laird .	18	5,074	2·27	20	7,143	2·32	22·17	1,066	2·98
Topaze .	,, .	18·1	4,992	2·3	20·2	7,092	2·2	22·1	9,860	2·65

* Estimated.

The advantages of turbines.

The success of the cruiser fitted with Parsons turbines is remarkable, and in view of the interest attaching to these trials the following observations are quoted at length from the *Times*:—

In the Viper torpedo-boat destroyer a similar comparison had been made with ordinary destroyers of identical dimensions having the same total weight assigned to machinery and boilers, but not identical boiler-power. In that case, while there was a great gain in maximum speed in the Viper, the turbines proved much inferior to reciprocating engines in the economical use of steam at cruising speeds where low powers sufficed, and the coal endurance at cruising speeds was much less than with ordinary engines. This is a serious matter in warships, which ordinarily cruise at low speeds. In the Amethyst Mr. Parsons aimed at economy in cruising speeds as well as at full-power: for this purpose separate small turbines have been fitted and are used when cruising. On the port shaft, at its forward end, there is a high-pressure cruising turbine, and in a similar position on the starboard shaft an intermediate pressure cruising turbine. At low speeds the steam enters the former turbine, then passes to the intermediate cruising turbine, thence to the main high-pressure turbine used for maximum power, and, finally, through the main low-pressure turbines to the condensers. At full-speed both cruising turbines are cut out, and the ship is driven by the three main turbines. A high rate of expansion is thus obtained at all speeds, and the results of trials have proved that the arrangements have secured the desired economy at cruising speeds, while adding considerably to the maximum speed.

The reciprocating-engined ships have exceeded the speed promised by the designer, reaching 22 to 22 1-3 knots; but the Amethyst has attained 23·6 knots—that is to say, she is faster by about 1·3 knots. Up to the speed of 14 knots the reciprocating engine shows a superiority in economy of steam and coal consumption. At 10 knots only about 900-horse power has to be developed out of 10,000-horse power available; and the Amethyst required about 2900 pounds of coal per hour, as against 2300 pounds in the Topaze. At 14 knots the two ships require about the same amount of coal, 4600 to 4700 pounds per hour; at 18 knots the Amethyst had a considerable superiority in performance, burning only 8400 pounds per hour, while the Topaze burnt 10,900 pounds. At 20 knots the Amethyst burnt 10,900 pounds, and the Topaze about 15,400 pounds. At full power the Topaze steamed 22·1 knots per hour, and burnt 26,100 pounds of coal; whereas the Amethyst steamed 23·6 knots,

and burnt only 24,400 pounds of coal. It is estimated that to drive the Topaze at equal speed 14,000-horse power would be required, and the maximum development possible in that vessel is about 9900-horse power. These figures show that from 14 knots upwards turbines arranged as in the Amethyst gain rapidly in economy in the use of steam, and so, with boilers of a given capacity, can develop much greater power and drive a ship considerably faster than reciprocating engines can drive her. Mr. Parsons is to be congratulated on having thus overcome, to a very great extent, the disadvantage at which the turbine was previously placed in warships when cruising. In merchant ships, designed to work constantly at or near maximum power, no corresponding difficulty occurs, and within the range of power occurring in practice greater economy of coal and steam is possible with steam turbines than with reciprocating engines, when both types are worked under the best conditions. These cruiser trials furnish data of the highest value to the designer of future swift ships for the mercantile marine as well as for war fleets.

The Amethyst class carry an armament of only twelve 4-in. guns, and though their speed might enable them to run away, they could fight, with any prospect of success, but few of the third-class cruisers belonging to our own or foreign navies.

Scouts.

The Sentinel was launched at Barrow on April 19, 1904; the Adventure at Elswick on September 8, the Attentive at Elswick on November 24, the Foresight at Fairfield on October 8, and the Forward at the same yard on August 29. The Pathfinder and Patrol were launched at Birkenhead on July 16 and October 13 respectively. The Sentinel went through her trials at the end of January. Loaded with all war stores and in a sea described as rough, she maintained a speed of 25·249 knots for eight hours, the I.H.P. developed being about 17,500. The speed attained is eminently satisfactory, but it is difficult to justify the expenditure of £275,000 on this type of vessel. Though they are of about 3000 tons displacement, they carry no gun larger than a 12-pdr., and therefore could not fight a cruiser of even the smallest size. They carry less than 400 tons of coal. Their duty as scouts could be as well performed in the narrow seas by destroyers, and better in the ocean by merchant cruisers. The chief use of this so-called "scout" class would be to carry out the work of destroyers at a distance from their base at which the latter could not act. The *Engineer* considers that all the requirements for a scout might be embodied by a 1500-ton ship, an improved Agordet with eight 4-in. instead of twelve 3-in. guns, 24 knots speed, and $\frac{3}{4}$-in. nickel steel armour to protect the vitals.

Destroyers.

During the past year three destroyers have been lost. The Decoy was sunk after collision with the Arun off the Scilly Islands on the night of August 13. The Chamois sank in the Gulf of Patras through one of her screw blades coming off and piercing her bottom while she was undergoing a full-speed trial. The Sparrowhawk sank after running on a rock at Chesney Island, at the mouth of the Yangtsze River; while the Haughty was run into by a cargo steamer in Harwich harbour while at anchor, and had to be beached.

Trials.

The following results of the trials of destroyers recently completed are taken from *Engineering*:—

	Makers of Hull and Engines.	Length.	Displacement.	Type of Boiler.	Four hours' Speed Trials.		Four hours' Coal Consumption.		
					I.H.P.	Speed.	I.H.P.	Speed.	Coal per I.H.P. per hour.
		Ft.	Tons.			Knots.		Knots.	lbs.
Dee . .	Palmer's .	225	550	Reed . .	7,306	25·50	7,206	25·41	2·28
Derwent .	Hawthorn .	220	550	Modified Yarrow	7,241	25·68	7,580	25·29	2·24
Waveney .	" .	220	550	"	7,307	25·62	7,574	25·35	2·19
Ribble .	Yarrow .	225	590	Yarrow. .	7,417	25·81	7,668	25·33	1·57
Welland .	" .	225	590	"	7,777	26·24	7,720	25·35	1·65
Kennet .	Thornycroft	220	550	Thornycroft—Schulz	7,445	25·66	7,543	25·99	2·39
Jed . .	"	220	550	"	7,990	25·98	7,425	25·39	2·46
Eden . .	Hawthorn (hull) Parsons (boiler)	220	550	Modified Yarrow	—	26·22	—	25·28	—

In addition to those which have made their trials the following destroyers have been launched, viz., the Boyne, Liffey, Ure, Kale, Doon, Moy, Chelmer and Wear.

Criticisms on new destroyers

These destroyers belong to the new class, with a designed speed of twenty-five and a half knots. After the disaster to the Cobra it was decided to construct destroyers with heavier scantlings, and to make the engines and boilers heavier in proportion to the power developed. As a result the speed achieved in these later destroyers on trial is only twenty-five and a half knots. The new destroyers carry a much heavier load on trial, and if they had been tried with the same load as those carried by the thirty-knot destroyers, they would have probably attained a speed of twenty-seven to twenty-seven and a half knots. This is a great reduction in speed as compared with the thirty to thirty-one knots of the earlier vessels of the class, and means that they will be unable to catch foreign torpedo-boats in smooth water. Has the gain in structural strength been too dearly bought by the sacrifice of speed? The following observations are quoted from an article on the subject in the *Times*:—

The latest destroyers in their dimensions closely approach torpedo-gunboats of the Sharpshooter class. They are somewhat similar in displacement, much inferior in weight of armament, and have much smaller bunker capacity and power of covering distance; but they are considerably faster, having engines of greater power and less weight in relation to power, and they cost much more than Sharpshooters. The new type of destroyer is about 75 per cent. greater in displacement than the 30-knot destroyers, and the cost is about 25 per cent. greater. The sea-keeping capability has been increased somewhat, no doubt, by increased dimensions and by the construction of high forecastles similar to those adopted seventeen years ago in the

Sharpshooter class. It is, however, unquestionable that neither in size nor in coal supply, nor in power of maintaining speed in rough water, can these vessels be regarded as suitable for independent sea service as scouts in company with fleets; while, for their primary use as torpedo-boat destroyers, their lower speed makes them distinctly inferior to the 30-knot type. It must not be forgotten that the latest sea-going torpedo-boats in our own and foreign navies have attained smooth-water speeds of 25 to 26 knots; indeed, some of them are faster in smooth water than the destroyers of recent date.

In view of the experience which has been gained during the war between Japan and Russia, there is good reason for reconsideration of our policy. Destroyers built in this country, by Messrs. Yarrow and Messrs. Thornycroft, for the Japanese Navy have been continually and successfully employed in wild winter weather under the trying conditions prevailing during operations against Port Arthur. In structure, type of machinery, and general characteristics, these Japanese destroyers closely resemble the British 30-knot type. They have been tried most severely, but are reported to have disclosed no weakness in hulls or machinery, and they have come through the ordeal with complete success. This satisfactory result is due, no doubt, in great measure to discretion and skilful management by the Japanese complements; but it may well give pause to advocates of the latest type of destroyers in the Royal Navy. These Japanese vessels, under similar conditions of loading and trial, are from 3 to 3½ knots faster than our latest destroyers, and they cost something like £20,000 less per vessel.

It is only fair to say that in a seaway the River class will probably prove as fast as the 30-knot destroyer, and this indeed is understood to be proved to be the case by actual experience.

During the year 1905–6 two types of destroyers are to be laid down—six described as "ocean going," and twelve as "coastal." The particulars have not yet been made public.

Submarines.

During the year under review twelve submarines have been completed, eleven are still under construction, and eleven are to be laid down during the year 1905–6. The policy of the British Admiralty as regards the construction of submarines has been very favourably contrasted in France with that of the French naval authorities, who have hardly yet come to a decision as to the best type of boat. It appears desirable to give in full the statement of the Secretary of the Admiralty in introducing the Navy Estimates in the House of Commons, so far as it relates to submarines:—

First of all, in regard to the actual character of our submarines, I believe it is known to the House that the first departure was the order given to Vickers Maxim to construct five submarines of the Holland model. At the same time a naval officer of great distinction, Captain Bacon, was appointed to have sole charge of the development of the submarine for the time, and he and Messrs. Vickers and Maxim together were associated to supervise the construction of the submarines and to improve the type as opportunity offered. So ably did they deal with this matter that even before the first Holland submarine was launched they had already evolved and laid down what is known as the A type—the first type of submarines. I do not want to go into a great deal of detail, but I would mention that the evolution of the submarine in the hands of Captain Bacon and Vickers Maxim has been this. After the A class there has been a still further development to the B class, and the comparison between the original boats and the B class is as follows:—The original boat was 150 H.P.; the present B class is 850 H.P. The original boat had a surface speed of 7½ knots; the B class has a surface speed of 13 knots and a radius of 500 miles. The displacement has risen from 120 tons to 300, and the below-water speed is 9 knots with a ten hours' endurance. The motive power on the surface is derived from a petrol engine; below water it is electricity. The reason of that is evident, because the petrol motor requires air, which cannot be obtained below water, and electricity requires a great deal of weight. The weight required for storing sufficient electricity for surface motor power would be prohibitive. As to the diving, these

boats dive dynamically, and not statically. They always retain a slight margin of buoyancy, and, when they are brought down to their lowest point of buoyancy, they dive by the application of a horizontal rudder. As soon as the vessel gets into motion she overcomes her natural buoyancy by the use of a horizontal rudder; so she can only remain under water while in motion under the application of the rudder. There is very great security in that, because if anything happens to the boat she must automatically rise to the surface. She takes three minutes to dive. There is no real generic difference whatever between a submarine and a submersible boat. It is a question of the margin of buoyancy. The submersible has considerably more margin of buoyancy than the submarine. We have now thirteen of these boats on the Navy list, exclusive of the five original Holland pattern. There are thirteen A and B type, and also ten more in an advanced stage of construction. These boats have been constantly at work during the last two years, subject to manœuvres of very great severity, but on all occasions they have proved themselves very reliable.

Mr. E. Robertson.—Could the hon. gentleman tell us what it would cost?

Mr. Pretyman.—I do not know the exact figure, but I should think about £150,000. The House will not expect, of course, that I should enter into any detail as to our intention with regard to the submarines or their distribution, but I may state generally that amongst those nations who use submarines in war, their *rôle* will be supplementary to the surface torpedo craft. They are able, through their invisibility, to do in the day exactly what surface torpedo craft can do by night. The main attribute of the latter is invisibility. That invisibility the submarines attain by day. They have, of course, a very considerable moral effect upon an enemy; that is certainly one of their attributes. Another advantage of the submarine over her sister, the surface torpedo craft, is that, as she approaches her enemy, or supposed enemy, in daylight, it is possible to make perfectly sure of the character of the ship she is attacking before she launches her torpedo. The House will recognise that one of the greatest possible dangers in war time is that at night a surface destroyer would have the very greatest difficulty in making quite sure of the character of the ship she was approaching in the dark, whereas in the daytime, with the submarine, that danger would altogether disappear. You may classify a submarine as a daylight torpedo-boat of moderate speed and very considerable radius of action. I would mention one other point. It is not a present condition, but it certainly may be looked upon as a possible condition, that certain areas in war time, by the use of surface torpedo craft by night and submarines by day, may be practically denied to large ships. At present the only answer to that is that the other belligerent should be in a similar position to deny those same waters to its enemy's ships. Therefore the submarine in that particular is the only answer to the submarine. There is one other immediate and very important function of the submarine, and that is the defence of our ports, harbours, and coast. That is the most important point. It is quite clear that the use of the submarine extends the range of the defence far beyond the guns of the forts defending any harbour. These vessels will not only defend the ports, but link up the defences, and the possession of a sufficient number of them would greatly reduce the anxiety of any Admiral entrusted with the defence of our coasts.

Mining defences transferred to the Navy.

The transfer of the mining defences of our ports from the Army to the Navy probably to some extent accounts for the more vigorous policy to be pursued as regards the construction of submarines. It is of vital importance to us that there should be free ingress and egress to all friendly ships at our ports in time of war. The Russo-Japanese war shows that the use of submarine mines may be as dangerous to friend as to foe. It is more than possible, as Sir Cyprian Bridge points out, that Russian ships were destroyed by Russian mines, and Japanese ships by Japanese mines, in the operations off Port Arthur. Submarine boats for the defence of ports would probably be less costly and certainly less dangerous to friendly vessels than a mine-field, and an equally effectual deterrent to the ships of the enemy, but as long as the command of the sea is maintained, neither submarine boats nor mines are needed for the

defence of ports. Submarine boats to be of real value should be used offensively. Little information is forthcoming as to the trials of British submarines. Nothing that has been published would seem to indicate that the submarine is anything more than an inferior kind of torpedo-boat, and of all the lessons to be drawn from the war none comes out more clearly than this—the torpedo-boat, handled though it was with consummate courage and skill by the Japanese, nearly always failed to attain its objective.

Ships removed from effective list.

One of the most important steps that has been taken for many years with regard to the Navy is the decision to remove from the dockyards a large number of ships, of which some are stated to be ineffective, and some not fully effective for purposes of modern war. The following is the classification of ships affected by this redistribution of the Fleet since October last, given in the Parliamentary Return of the "vessels struck off the list of effective ships of war," in a form which is designed to satisfy the demand made by Mr. Robertson in the House of Commons, but which Lord Selborne, to judge from his observations in the House of Lords, does not consider wholly satisfactory. Miscellaneous vessels, including hulks, store ships, etc., have been omitted.

1b.—Ships of comparatively small fighting value, whose armaments have not been surrendered :—

Battleships.—Sans Pareil, Collingwood, Conqueror, Hero.

Cruisers.—First Class.—Immortalité, Narcissus, Undaunted, Aurora. Second Class.—Tribune, Andromache, Pique, Naiad, Apollo, Melampus, Intrepid, Spartan, Rainbow, Retribution. Third Class.—Pomone, Pactolus, Medusa, Medea, Philomel, Pylades.

Torpedo Gunboats.—Alarm, Sheldrake, Antelope.

2a.—Ships which are available for subsidiary purposes of war :—

Cruisers.—Second Class.—Mercury, Amphion. Third Class.—Brisk, Calliope.

Torpedo Gunboats.—Rattlesnake, Onyx.

Sloops.—Alert, Algerine, Cadmus, Clio, Fantome, Mutine, Melita, Torch, Merlin, Phœnix, Racer, Rinaldo, Rosario, Vestal, Odin.

Gunboats.—Bramble, Britomart, Landrail, Magpie, Peacock, Pheasant, Pigeon, Rattler, Redpole, Ringdove, Thistle, Thrush, Cockchafer, Albacore.

3.—Vessels obsolete :—

Armoured.—Superb, Alexandra, Sultan, Dreadnought, Iron Duke.

Gun Vessel.—Curlew.

3.—Vessels for sale and sold :—

Armoured.—Simoom (late Monarch).

Cruisers.—First Class.—Warspite, Australia, Galatea, Orlando, Northampton, Hector. Second Class.—Arethusa, Severn, Mersey, Raleigh, Boadicea, Iris, Active. Third Class.—Archer, Cossack, Fearless, Mohawk, Porpoise, Tartar, Racoon, Barracouta, Barrosa, Marathon, Magicienne, Melpomene, Blonde, Pearl, Blanche, Rigarooma, Mildura, Phœbe, Katoomba, Wallaroo, Pallas, Tauranga.

Torpedo Gunboats.—Gleaner, Renard, Jaseur, Grasshopper, Boomerang, Karrakatta, Salamander, Sandfly.

Sloop.—Beagle.

Note No. 1.—This return includes other vessels besides those which can be strictly described as non-effective, and it has been prepared so as to include all ships no longer in the first fighting line. They are classified under the headings in which they will appear in Appendix B of Dockyard Expense Accounts Blue-book for 1903-4.

Battleships and cruisers.

Of the battleships included in the return, all, with the exception of those under the heading 1b (the Sans Pareil, Collingwood, Con-

queror, and Hero) and of the cruisers, the Amphion class (4), Archer class (7), Blonde class (4), Iris and Mercury, had already been struck out of the Comparative Tables of effective ships in the *Naval Annual*. The Return presents some curious anomalies. Four of the Orlando class are included under 1*b* amongst the ships whose armaments have not been surrendered, while three—the Australia, Galatea, and Orlando—are to be sold. These ships carry a very heavy armament for their size, viz., two 9·2-in. and ten 6-in. Q.F.C. guns, and are protected by a 12-in. belt of compound armour. Of the Pearl class, which with the five Australian cruisers numbers nine vessels—one, the Philomel, is included under 1*b*—the remaining eight are to be sold. The Pearl or Katoomba class, as has been pointed out in previous numbers of the *Naval Annual*, are too small for service in the stormy seas of the South Coast of Australia, through which the shipping bound for Adelaide, Melbourne, and Sydney passes; but they might still be useful for the protection of commerce against many of the third-class cruisers still maintained in commission by foreign navies. Of the Archer class the Brisk is retained under head 2*a*, as "available for subsidiary purposes of war"; the remaining six vessels are to be sold. The above anomalies are probably to be explained by the assumption that the vessels to be sold could not be made effective for service without a heavy expenditure on their refit.

Torpedo-gunboats.

Several of the torpedo-gunboat class have recently been re-boilered and re-engined at a cost not far short of their original cost. As a result their speed has been increased from 21 to 22 knots. They have proved in manœuvres an effective defence against torpedo-boats, and are good sea boats; but it is not worth while to spend money on the refit of those which have not yet been taken in hand.

Sloops and gunboats.

Fifteen sloops and fourteen gunboats (excluding the torpedo-gunboats Onyx and Rattlesnake) are set down, under heading 2*a*, as "available for subsidiary purposes of war." Included in the list are the Mutine, Fantome, and Rinaldo, completed in 1902; and the Cadmus and Clio, completed in 1904. The expenditure of money on sloops and gunboats, which were only useful for police duties in peace time—duties which, except in the Chinese and certain African rivers, would be more effectively performed by a smaller number of third-class cruisers—has been repeatedly condemned in the *Naval Annual*. It is satisfactory that the construction of such vessels is to cease. We have enough already built to satisfy our requirements.

Eliminations too drastic.

The putting out of commission and the removal from the dockyards of the large number of ships included in this return will not only relieve the Estimates of a large expenditure for maintenance and repairs, but will set free a large number of officers and men for

services in which they can be more usefully employed. Most of the ships struck off the list may not be wholly effective, but in the cruiser class the process of elimination has, we suggest, been somewhat too drastic. For scouting duties and the protection of commerce numbers above all things are necessary, and in war it has always been found that there is a use for cruisers of all sizes. We are selling or striking off the effective list several cruisers quite capable of fighting the numerous third-class cruisers of France or Germany, and our cruiser strength, from the point of view of numbers, will be very seriously diminished. This question is more fully dealt with in the chapter on comparative strength, but we may say here that the present requirements of the British Navy render it desirable at any rate to keeping the ten Naval Defence Act cruisers in a reasonable state of repair, and to transfer the Pearl class, which are to be sold, to the list of those vessels whose armaments have not been surrendered.

Fleet in Commission in Reserve.

The establishment of the "Fleet in Commission in Reserve" is another important step which has been taken during the past year. The principal officers and a nucleus crew of about two-fifths the total complement have been told off to the ships, which have been removed from the dockyards and stationed in their immediate neighbourhood. They are to go to sea for periodical cruises, and are to be kept in all respects ready for immediate commission. The establishment of the Fleet in Commission in Reserve has two advantages. It enables our principal fleets to be kept always up to full strength, emergency ships being provided to replace those which may be temporarily disabled; it provides a powerful squadron, ready at a moment's notice, to reinforce our battle fleets on the outbreak of war.

Changes in system of administration.

Amongst other steps affecting the administration of the Navy taken during the year under review must be mentioned the Order in Council defining the functions of the various members of the Board of Admiralty, and the Parliamentary Paper showing the present distribution of business amongst them. Both are printed in Part IV.

Committees on Designs and Dockyard Administration.

In addition, a Committee on Designs, of which the First Sea Lord is the President, has been appointed, the composition of which is given in the First Lord's Memorandum. It includes five responsible naval officers, certain other naval officers, besides Lord Kelvin, Sir John Thornycroft, and other representatives of the leading engineering and shipbuilding firms. Hitherto the Board of Admiralty has been responsible for the designs of warships; the Controller and Assistant Controller (or Chief Constructor) for carrying the designs into execution. The establishment of the Committee on

Designs will clearly diminish the responsibility of the Board of Admiralty, the Controller, and the Chief Constructor for the designs of warships. The Committee on Dockyard Administration, of which the First Sea Lord is also the President, must also tend to undermine the position of the Controller, and diminish both his responsibility and that of his assistant, the Director of Dockyards, for the efficient working of this department. The establishment of both these committees appears to be opposed to the sound principles of administration which have hitherto prevailed at the Admiralty.

Estimates for 1905–6.

The Navy Estimates for 1905–6 amount to £33,389,500, as compared with £36,889,500 in 1904–5, or a decrease of £3,500,000. For this decrease the Shipbuilding Vote is responsible to the extent of, roughly, £3,000,000 (viz., Contract Work, £2,486,000; Shipbuilding in Dockyards, £521,000), while the vote for Naval Armaments shows a decrease of £660,000, and the vote for Victualling and Clothing, which is dependent on the number of men, a decrease of £171,000. These and other minor decreases are counterbalanced by a heavy increase of £271,000 in the Naval Works Vote, and an increase of £64,700 in the Non-Effective Votes, which are now beginning to feel the increase in the permanent force which began some twelve years ago. In urging, as we have consistently done in these pages for many years, for some limitation being placed on the increase of the permanent force, and greater attention being devoted to the development of Naval Reserves, we have over and over again pointed out that when the demand for economy came (and for the first time for many years there was such a demand made in the speeches of prominent members of the House of Commons on the Navy Estimates of last year), the economy would be certain to be made in the Shipbuilding Vote. The prophecy has been realised. We are only to lay down one battleship, which is to be named the Dreadnought, during the year, and we shall only have eight battleships under construction, as compared with eight for Germany and twelve for the United States. Some reduction in the Shipbuilding Vote is possible, owing to the destruction of a large proportion of the Russian Fleet, the reaction of public opinion in the United States, which has caused Congress to reduce the shipbuilding programme submitted by the Navy Department; and the decision to expedite new construction. But at all costs we must keep our battleship construction going, and make economies, if necessary, in other directions. Nothing will compensate for inferiority in the line of battle. The programme of new construction includes, besides one battleship, four armoured cruisers. For reasons which have been already given, it appears desirable that in the next programme of

new construction some battleships and cruisers of moderate size and cost should be included.

Personnel. The decrease in the numbers of the permanent force and the increase in the number of the Reserves are the most satisfactory features of the Navy Estimates for 1905–6. It is no mean achievement to have succeeded in so short a time in bringing the Reserves up to the standard recommended by Sir Edward Grey's Committee, viz., 50 per cent. of the numbers required for mobilisation for war. The Royal Naval Reserve, thanks to the improved conditions of training, has been brought up to 29,500 men. The Fleet Reserve has steadily increased, while the Naval Volunteer Reserve has made a good start. The fact that "Boys" show a decrease of 2100 seems to foreshadow a further decrease in the permanent force next year, which will have been rendered possible by the increase in Naval Reserves, as well as by the removal of ineffective ships from the Navy List. Owing partly to the latter cause, partly to the constant and large increase in the permanent force, against which we have frequently protested in these pages, there is now an enormous accumulation of men in the Home ports, which is probably not far short of 40 per cent. of the total strength of the *personnel*. A proportion of these men are usefully employed in the Fleet in Commission in Reserve, others are going through courses. But a large number are not employed, and their efficiency must be deteriorating. A further increase in the Reserves and reduction in the permanent force is the best remedy.

Naval works. The manning question is dealt with at length in a later chapter. The increase in the Naval Works Vote, which is the most unsatisfactory feature of the Estimates, would have been greater than it is but for the wise decision to close some of the smaller naval establishments abroad (*e.g.*, Port Royal, Halifax, and Esquimalt). The maintenance of other bases was not needed for the North Atlantic Squadron.

CHAPTER II.

Foreign Navies.

France.

The fall of the Cabinet of M. Combes has brought about the removal of M. Pelletan from the Ministry of Marine. His tenure of the office was marked by a partial paralysis of naval construction, and by the introduction of political influences into the Navy which are new to it, and which have had a serious effect on discipline. His successor is M. Gaston Thomson, who has devoted much of his time to the study of naval and financial questions, and who was reporter on the Naval Budget in 1893. M. Thomson, when he accepted the portfolio, was vice-president of the Extra-Parliamentary Commission on the Navy. He holds the view that, having regard to naval expansion abroad, the time has come for vigorous policy in the matter of naval construction, after a careful consideration of the necessary types of vessels.

The preliminary Estimates for 1905 amount to £12,722,752. There is an increase of £80,000 in the votes for wages and victualling, and a similar increase in the vote for new construction. Provision is made for laying down six vessels—the armoured cruiser Waldeck-Rousseau (ex C 17), four destroyers, and a despatch vessel. It is intended that the Quinet, Rousseau, and Ernest Renan shall constitute a homogeneous class, and therefore the designs of the two first named have been modified. The discussions on the Estimates in the Chamber showed that the Navy was not considered to be in a satisfactory condition. The delays in construction, the insufficiency of the stocks of ammunition and coal, and the difficulty of manning the Navy under the new law for military service, were especially commented upon. **Estimates for 1905.**

The Report of the Commission on the Navy Estimates for 1905, by M. Charles Bos, is of unusual interest, both as regards *matériel* and *personnel*. The programme of 1900 proposed that the French Navy should comprise twenty-eight battleships (four squadrons of six battleships each and four in reserve), twenty-four armoured cruisers, and fifty-two destroyers. M. Messimy pointed out in his Report last year that the cost of the construction of the vessels comprising the programme of 1900 would exceed the Estimates by £1,360,000, and **Programme of 1900.**

that they would be completed in seven years instead of six. We know to-day, says M. Bos, that the expense will exceed the estimate by £1,460,000, and that it will take eight years instead of seven for all the ships provided in this programme to be completed.

Battle-ships.

The programme comprised six battleships. The République, which was laid down in December, 1901, and launched in 1902, is now set down for completion in August, 1906; the completion of the Patrie, for which the contract was signed in 1901, is set down for February, 1907; that of the Liberté, Justice, and Vérité, for which the contracts were signed in May, 1902, are set down for December, 1907, November, 1907, and the beginning of 1908 respectively. The Démocratie, which was laid down on May 1, 1903, and launched on April 30, 1904, is now estimated to be ready for sea in July, 1907, instead of at the end of the year. The delay in the completion of these ships was attributed by the late Minister of Marine to the extra time asked for by the contractors for delivery of the turrets. M. Bos says that it can be confidently asserted that the scantlings of all the ships of this type are much too weak—a weakness made evident at the launch of the Patrie. The secondary armament of the République and Patrie comprises eighteen 6·4-in. guns; that of the four other ships comprises ten 7·6-in. guns, mounted singly in turrets—the main reason for the modification being due to the fact that the working of the guns mounted in pairs, in the case of the Desaix class, is found to be almost impossible, owing to the diameter of the turret being too small.

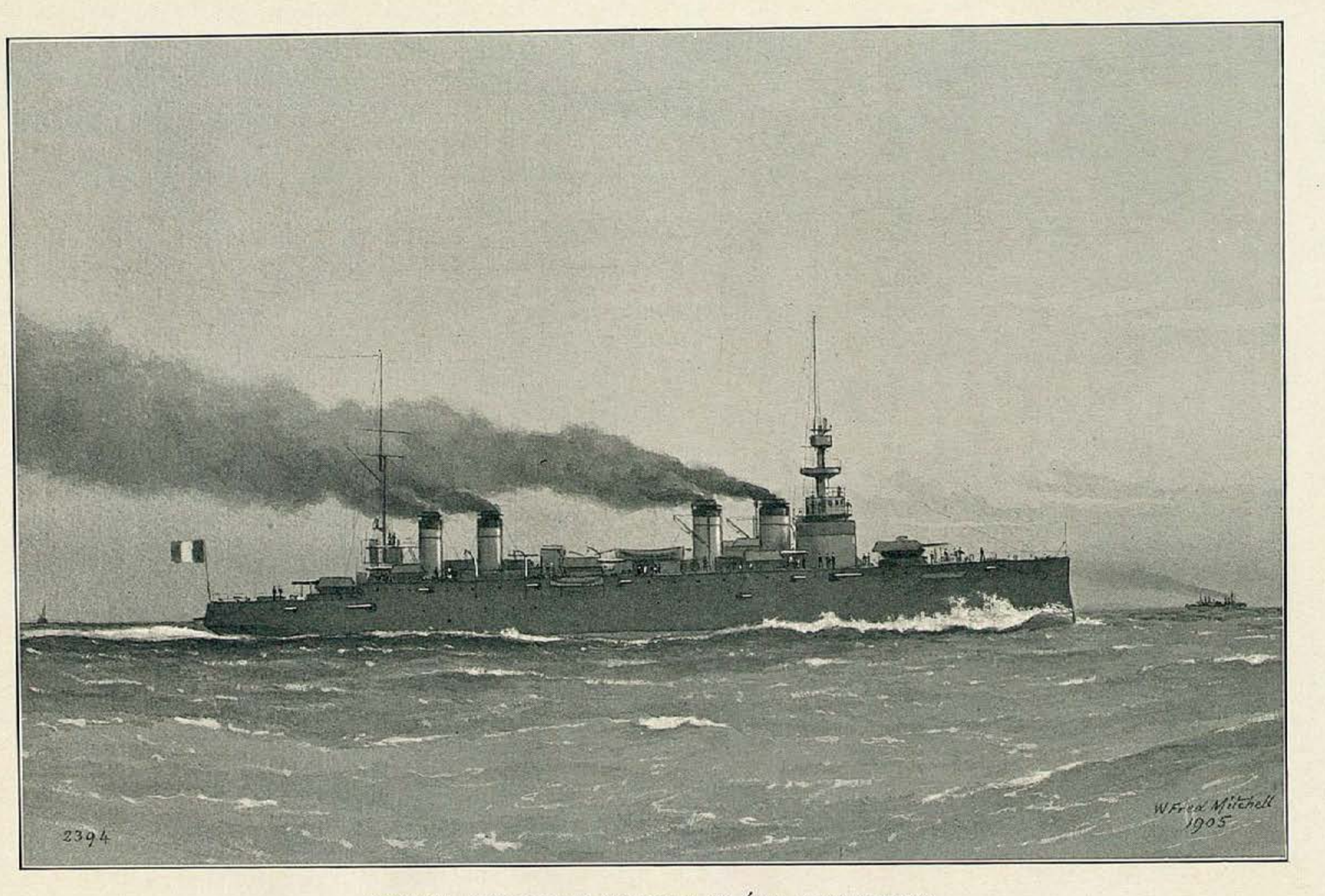
Armoured cruisers. Jeanne d'Arc.

The Jeanne d'Arc was laid down in 1895. On her trials in January, 1903, she attained a speed of 21·6 knots, instead of the 23 knots estimated. Her bilge keels and the supports of the propellers were then reduced, and on her next trials she attained a speed of 21·7 knots—a gain of only one-tenth of a knot. The officers of the ship assert that the great length of the hull compared with the beam entails at certain speeds such vibration as makes it quite impossible to point the guns.

All the armoured cruisers of the Gueydon, Condé, and Léon Gambetta classes are condemned—like the battleships—by M. Bos for their weakness of construction; the frames being placed too far apart, especially in the after part of the ship. All the ships of these classes have had to be strengthened, with the exception of the Montcalm, constructed at La Seyne, which the constructor of the Forges et Chantiers at La Seyne strengthened on his own initiative. The designed speed of 21 knots has, with difficulty, been attained by the vessels of these classes.

Gueydon class.

The Dupetit-Thouars, 9367 tons, the last of the Gueydon class,



FRENCH ARMOURED CRUISER "LÉON GAMBETTA."

is to be completed by the end of this year, after having been eight years and a half under construction. She commenced her trials at Toulon in December. On a six hours' run she developed 2023 H.P., with a coal consumption of 1·144 lb. per H.P. per hour.

The Condé, of the next class, of 9856 tons, has completed her trials. On the twenty-four hours' trial the mean speed attained was 18·6 knots with 9900 I.H.P., coal consumption 1·6 lb. per I.H.P. per hour. On her full speed trials, which took place in May, she attained a speed of 21·4 knots with 22,175 I.H.P., instead of 21 knots with 20,500 I.H.P., as estimated. The gunnery trials are reported by the *Yacht* to have been satisfactory. The Condé is attached to the Northern Squadron, and all the other ships of the class—Gloire, Sully, Marseillaise, and Amiral Aube—have been commissioned. The Sully ran on an uncharted rock in Along Bay, Tonkin, early in February. The attempt made to float her has failed up to the time of writing; the armament has been removed, and she must be considered a total loss. **Condé class.**

The Léon Gambetta, 12,351 tons, which was damaged by running on the Black Rocks, off the Goulet of Brest, was again ready for her trials in August, 1904. On a thirty hours' trial she attained a mean speed of 20 knots with 16,050 I.H.P. On a full speed trial she steamed 22·2 knots, or slightly over the designed speed of 22 knots, with 25,000 I.H.P. She is the first to be completed of the 1900 programme. The *Yacht* considers that the Léon Gambetta is better protected than the Drake class, that the armaments are of about the same value, and that the superiority of speed of the Drake is only a few tenths of a knot above that of the Gambetta. It therefore considers the Gambetta the better ship—a somewhat partial judgment. As mentioned in last year's *Naval Annual*, the Victor Hugo, sister-ship to the Léon Gambetta, was launched on March 30, 1904. She is expected to run her trials in the course of the year. The third ship of this class, the Jules Ferry, is completing at Cherbourg for her trials. **Léon Gambetta class.**

The cruiser Jules Michelet, 12,370 tons, was laid down on April 3 on the slip from which the Victor Hugo was launched at Lorient, and belongs to the same class, while the Ernest Renan, which has been begun at St. Nazaire, is to be much larger, displacing 13,427 tons, length 515 feet, with a speed of 23 knots. In the Michelet and Renan, the secondary armament consists of twelve 6·4-in. guns, instead of sixteen as in the Gambetta and Quinet.

The chief feature in French naval construction during the past year is the laying down of the cruiser Edgard Quinet, which was described in the Estimates of 1904 as C 16. The construction was **Edgard Quinet.**

temporarily suspended, for the reason already given. The principal characteristics of the Quinet and Waldeck-Rousseau, ex C 17, according to the annexe just published to the Estimates for 1905 are now as follows:—Length, 528 ft.; beam, 70¼ ft.; maximum draught, 27 ft.; displacement, 13,481 tons; I.H.P., 36,000; speed, 23 knots. Radius of action at 10 knots, 12,000 miles, with 2,300 tons of coal. The armament is to be the same as that of the Jules Ferry, viz., four 7·6-in. and sixteen 6·4-in. guns. The minor armament consists of twenty-four 1·8-in. and two 1·4-in. guns. The length of these ships is condemned by M. Bos, who points out that there will be great difficulty in getting the Edgard Quinet down the River Penfeld, unless the river be dredged.

Destroyers. Of the twenty-eight destroyers of the programme of 1900, twenty-one were completed at the end of 1904. The Arc, Baliste, Bélier, Dard, Francisque, Mousqueton, Sabre and Sarbacane were completed in 1903–4. M 38 and M 39 have been named the Carquois and Trident. The four destroyers of the programme of 1906, M. 40 to 43, will each have: Displacement, 336 tons; length, 190·4 ft.; beam, 20·4 ft.; draught, 9·8 ft.; I.H.P., 6800; speed, 28 knots; and armament, one 2·56-in. and six 1·85-in. guns, and two torpedo tubes for 17·7-in. torpedoes.

Torpedo-boats. In the Memorandum of the Minister of Marine, the torpedo-boats included in the *Etat* of 1905 are as follows: Twenty-three (Nos. 295 to 317) of the programme of 1903, fifty to be laid down in 1904 by contract (Nos. 318 to 367), two laid down in 1904 at Toulon, and twenty to be ordered in 1905. The following are the yards in which the twenty-three boats of the 1903 programme are being built:—Nos. 295, 296 (M. Normand, Havre), 297 to 299 (Chantiers de la Gironde, Bordeaux), 300 to 302 (Dyle & Bacalan, Bordeaux), 303 to 305 (Chantiers de la Loire, Nantes), 306 to 308 (Chantiers de la Mediterranée, Havre Yard), 309 to 311 (Creusot Company, Chalon-sur-Saône), 312 to 314 (Société de Saint Nazaire, Rouen), 315 to 317 (Chantiers Dubigeon—new to naval work—Nantes).

Torpedo-boat No. 293, built by Normand, of Havre, is fitted with Parsons turbines and two Normand boilers. On her full power trial she made 26·2 knots. No. 294 was launched at Bordeaux on August 2; she is fitted with Brequet turbines. The first-class torpedo-boats Nos. 277–293 are rather longer than their predecessors, and have an estimated speed of 26 knots. Their displacement is 97 tons. No. 286 is reported to have made 27·8 knots on her trials, which is a record for first-class torpedo-boats.

Submarines. The twenty submarines of the Naïade type, and the submersibles X, Z, and Aigrette, were to be completed at the end of 1904. To

these must be added the Cigogne, sister of the Aigrette, and others under construction in 1905. The six submersibles of the Emeraude type designed by M. Maugas, who made the plans for the Gnome and X, are the largest submarine craft yet put in hand. They are to have a total displacement of 415 tons, and to be 146 ft. long, with 12 ft. 9 in. diameter. Explosion motors for surface navigation, and electric accumulators for use submerged, are to give a higher speed than in previous classes. There will be six torpedo tubes. The Emeraude, Opale, and Rubis are in hand at Cherbourg, and the Saphire, Turquoise and Topaze at Toulon. In contrast to these are the two boats of the Guêpe class. Ten of the class were to have been constructed, but the order has been countermanded and two only will be put in hand (Q 49 and 50), mainly to test a new type of explosion motor adapted for both surface and submerged navigation. Nos. Q 51 to 58 have been suppressed. The programme also includes two submersibles (Q 47 and 48) at Toulon, designed by M. Laubeuf; two submarines (Q 59 and 60) at Cherbourg, designed by M. Petithomme; and a trial boat (Q 61), to be built at Toulon. Q 47 and 48 will displace 351 tons, with 154 ft. 6 in. length, 16 ft. beam, about 11 ft. draught, and 440 H.P. in electric and explosive motors. The boats of the Guêpe class will displace about 45 tons, with 67 ft. 6 in. length, 7 ft. beam, 6 ft. 7 in. draught, and 240 H.P. The so-called submarines at Cherbourg (Q 59 and 60) will be comparatively large vessels, displacing 426 tons, with 180 ft. 6 in. length, 12 ft. 10 in. beam, 1,200 H.P. As to the trial boat (Q 61), of a type intended to be embarked, she will displace only 21 tons, with 36 ft. 6 in. length, 6 ft. 6 in. beam, and 140 H.P. She will be completed this year, while the Guêpe boats are to be out of hand in the summer of 1906, and the Toulon and Cherbourg boats before the end of that year. The thirteen submersibles of the 1902 programme (Aigrette class) are the Aigrette, Cigogne (both launched), Eider, Macreuse, Grèbe, Cygne, Marabout, Héron, Pluvier, Pinquin, Plongeon, Pelican, and Vanneau.

The programme of 1896 provided for the refit of fifteen ships. The refit of the following has now been completed:—Baudin, Formidable, Courbet, Redoutable, Dévastation, Terrible, Caïman, Indomptable, Requin, Hoche, Furieux. In the Estimates for 1905 a sum of £24,000 is provided for fitting the Magenta, Neptune, and Duperré with new boilers. No further sum will be spent on them. Refits.

The refit of the Courbet, which was launched in 1881, has been completed. The new armament comprises four 10·8-in. guns with shields and eleven 5·5-in. guns. The Dévastation, which is practically a sister-ship to the Courbet, has only 3·9-in. guns for her secondary

armament. The cylindrical boilers in the case of the Courbet have been retained, whereas in the Dévastation they were replaced by water-tube boilers. The *Yacht* considers these ships are still valuable for service, on account of their good armament and their good sea-going qualities.

The old coast defence ship Furieux, which was launched in 1883, has been fitted with Belleville boilers and economisers, and has attained a speed of 14·3 knots on her trials. The two 13·4-in. guns have been replaced by two 10·8-in. The cost of the refit, estimated at £101,000, will be considerably exceeded.

The coast defence ship Valmy, after a year in dockyard hands, is ready for sea. Her boilers have been re-tubed, her rolling reduced by bilge keels, and the rapidity of fire of the principal armament doubled by the fitting of Capt. Guye's loading apparatus.

Torpedo flotillas.

The increasing importance of the coast defences has caused a change to be made in the designation of the old "Défenses Mobiles." The mobile defences of Cherbourg, Dunkerque, and St. Servan are now known as the first, second, and third Channel flotillas; those of Brest, Lorient, and Rochefort as the first, second, and third Ocean flotillas, and those of Toulon, Corsica, Tunis, Algiers, and Oran as the five flotillas of the Mediterranean. In the same way flotillas are constituted in the Indian Ocean and Chinese waters. Under the head of mobile defence there is to be an increased expenditure of about £80,000 in 1905 as compared with 1904. The force at most of the home stations, and in Algeria and Tunis, is to be increased. Two new stations have been established in Indo-China, and one at Dakar, on the West African coast, an important strategic point, while the number of torpedo-boats at each of the colonial stations is to be increased to twenty-six first-class torpedo-boats instead of five in 1904.

1904.		
Cochin-China	In commission	1 destroyer
	,,	3 3rd cl. t.bs.
	Disponibilité .	3 1st cl. t.bs.
	In reserve . .	2 3rd cl. t.bs.
Diego-Suarez	In commission	1 1st cl. t.b.
	Disponibilité .	1 1st cl. t.b.

1905.		
Rach-Dua Cape St. Jacques	In commission	1 destroyer
	,,	4 1st cl. t.bs.
	Disponibilité .	4 1st cl. t.bs.
	In reserve .	2 2nd cl. t.bs.
Saigon	In commission	1 3rd cl. t.b.
	,,	2 vedettes
	Disponibilité .	1 3rd cl. t.b.
	,,	2 vedettes
	In reserve .	1 3rd cl. t.b.
Tonkin	In commission	3 1st cl. t.bs.
	Disponibilité .	3 1st cl. t.bs.
Diego-Suarez	In commission	3 1st cl. t.bs.
	Disponibilité .	3 1st cl. t.bs.
Dakar .	In commission	3 1st cl. t.bs.
	Disponibilité .	3 1st cl. t.bs.

Sub-marines.

The following new stations for submarines, all of which are to be in commission, have been established, viz.: Cochin-China, Cape

St. Jacques, Tonkin, Diego-Suarez, Ajaccio, Bonifacio, Algiers, La Goulette, and Susa. Two submarines are provided for each station, except Algiers, which will have three. A new station is to be established at Dunkerque, with four submarines, in place of that at Rochefort, which is to be suppressed. The boats in the Cherbourg section now constitute the Channel submarine flotilla, those at La Pallice the Ocean submarine flotilla, and those at Toulon and Bizerta the Mediterranean submarine flotilla.

Personnel.

The total numbers voted for the Navy are as follows:—

	Ashore.	Afloat.	Reserve.	Total.
1904 .	5,269	35,791	6,611	47,671
1905 .	5,302	37,907	6,465	49,674
Difference .	+ 33	+ 2,116	− 146	+ 2,149

The annual contingent now required for the Navy is, according to M. Bos, about 9000 men,* who are recruited from two different sources:

1. The *Inscription Maritime.*
2. Voluntary enlistments.

The *Inscription Maritime* furnishes annually—

(*a*) 1000 to 1200 men, who serve for one year only, being liberated from obligation to serve longer, as the supports of a family, or for other reasons.

(*b*) 3500 to 3700 men, who are retained in the Navy for a period which during the last five years has ranged from 54 to 48 months, and which at the present moment is 46 months.

Voluntary enlistment is of three kinds—for long service, for five years, and for three years; and the number furnished by each class in 1901 and 1902 was as follows:—

	Long Service.	Engagements for 5 years.	Engagements for 3 years.	Total.
1901 .	430	3356	1125	4911
1902 .	343	2985	164	3492

Estimated Deficiency.

In the year 1902 the numbers furnished by the two sources of supply was thus nearly 1000 short of the numbers required.

The reduction of military service to two years will render inevitable the putting in force of the law already passed by the Chamber, reducing the service of the "inscrits maritimes" to 36 months, and when the law is put in force the numbers annually furnished by the *Inscription Maritime* will be reduced by 700 men, and those by voluntary enlistments by 800 men, or a total deficiency of 1500 men.

* In debates on the Estimates it was put at from 11,000 to 12,000 men.

M. Bos suggests two methods of providing for the deficiency:—

1. Inducing a larger number to re-engage.
2. Inducing a larger number to re-engage for long service and for five years.

At present about 50 per cent. of the *inscrits* and 30·5 per cent. of the volunteers re-engage. He further suggests that the service of those who enter through the training-ships (*écolès des mousses*) should be extended to eight or ten years.

From this brief summary of M. Bos's report on the *personnel*, it is evident that the French are likely to have serious difficulty in the near future in providing the numbers required for manning their Navy.

New Programme.

As to the policy of naval construction which is to be pursued in France, M. Bos makes the following interesting observations:—

"Ce n'est donc plus à l'Angleterre qu'il convient de nous comparer quand nous voulons connaître les besoins de notre flotte. L'espoir serait trompeur de penser que tout danger de conflit avec elle étant heureusement écarté, nous pourrions réduire sans péril nos dépenses navales. L'Allemagne, il y a quelques années encore puissance à peu près négligeable au point de vue maritime, est en train de devenir notre égale et peut-être de nous dépasser."

He then compares the probable strength of the fleets of the Triple and Double Alliance in 1907 and 1908 as follows:

	Germany.	Italy.	Austria.	Total.	France.	Russia.	Total.
Battleships . .	27	19	16	62	28	21	49
Armoured Cruisers	15	6	2	23	23	14	37
Destroyers . .	22	13	7	42	55	35	90

The strength of the United States fleet in 1908 he estimates at 23 battleships, 10 large cruisers, 18 protected cruisers, besides other vessels. He then points out that France is threatened in the near future with the loss of her position as the second naval Power, and concludes by laying down the naval policy of France in the following terms:

"Est-ce une raison pour désespérer de l'avenir? Nous ne le pensons pas. La France a réussi, au lendemain de ses désastres, à se constituer un vaste empire colonial qui satisfait à ses ambitions. Mettre ces immenses territoires en valeur, y propager la civilisation et poursuivre sur notre propre sol l'œuvre de progrès social et d'émancipation intellectuelle qui fait le mérite et la gloire de la République, cette tâche pacifique et féconde nous suffit. Ne nourrissant des visées agressives contre personne, nous pouvons

assister sans envie et sans haine au développement des peuples qui nous entourent, et nous résigner sans trop de regret à voir d'autres pavillons flotter plus souvent que le nôtre sur les mers du globe.

"Mais même si nous adoptons cette sage attitude et si nous renonçons à poursuivre un idéal irréalisable de suprématie maritime, une nécessité demeure : ne pas nous laisser distancer par les marines étrangères, et surtout par la Marine Allemande, dans une mesure qui pourrait devenir dangereuse pour notre indépendance, garder au milieu des flottes environnantes une flotte assez puissante pour inspirer le respect et être assez forte au besoin pour que de notre concours ou de notre abstention dépende l'issue d'un conflit. Car la plus sûre manière de maintenir la paix parmi les peuples est encore d'établir entre eux un juste équilibre de forces."

New programme. M. Bos's opinion.

In order that the French Navy may maintain its position it is necessary that three battleships or armoured cruisers should be completed each year. As to the type of ship to be constructed, she should be, according to the opinion of most of the officers M. Bos has consulted, of 15,000 tons displacement, at least 23 knots speed on service, and with a main armament of four 12-in. or 9·4-in. guns of the new model, and the rest of the armament composed of 7·6-in. guns. Some sacrifice will have to be made in protection. Such a ship might be either classed as a battleship or armoured cruiser, and would closely resemble in character the Vittorio Emanuele type. In order to remain within the limits of an expenditure of about £5,000,000 per annum on new construction, M. Bos suggests that instead of three ships of 15,000 tons, two of 15,000 and one of 12,000 tons should be built each year. M. Pelletan was of the same opinion as M. Bos as to the necessity of speed in modern warships.

M. Thomson's intentions.

The intention of M. Thomson is to submit to the Naval Board a new programme of the number of vessels which it is desirable to complete within a determined period, and the decision as to type between the battleship and the armoured cruiser. When the programme has been decided upon, he will ask Parliament to vote the necessary sums to put in hand a complete division of vessels of the type recommended. By devoting annually to new construction the same sum as in 1905, viz., £4,840,000, there could be built, besides destroyers and torpedo-boats, within the next twelve years, twenty-four battleships and armoured cruisers, which would enable France to keep her position amongst the naval Powers of the world. It is significant that the resolution inviting the Government to submit without delay a programme of new construction was adopted by 450 votes to 108.

Germany.

The progress of the German Navy is fully dealt with in a later chapter.

Italy.

The Italian Navy made considerable progress last year, two battleships having been launched and another completed. The only armoured cruiser which was under construction, the Francesco Ferrucio, is also now out of hand. Early in the year inquiries were made into the cause of the delays, and certain officials were removed from their appointments. These changes do not, however, seem as yet to promise much further naval increase, except in the matter of torpedo craft.

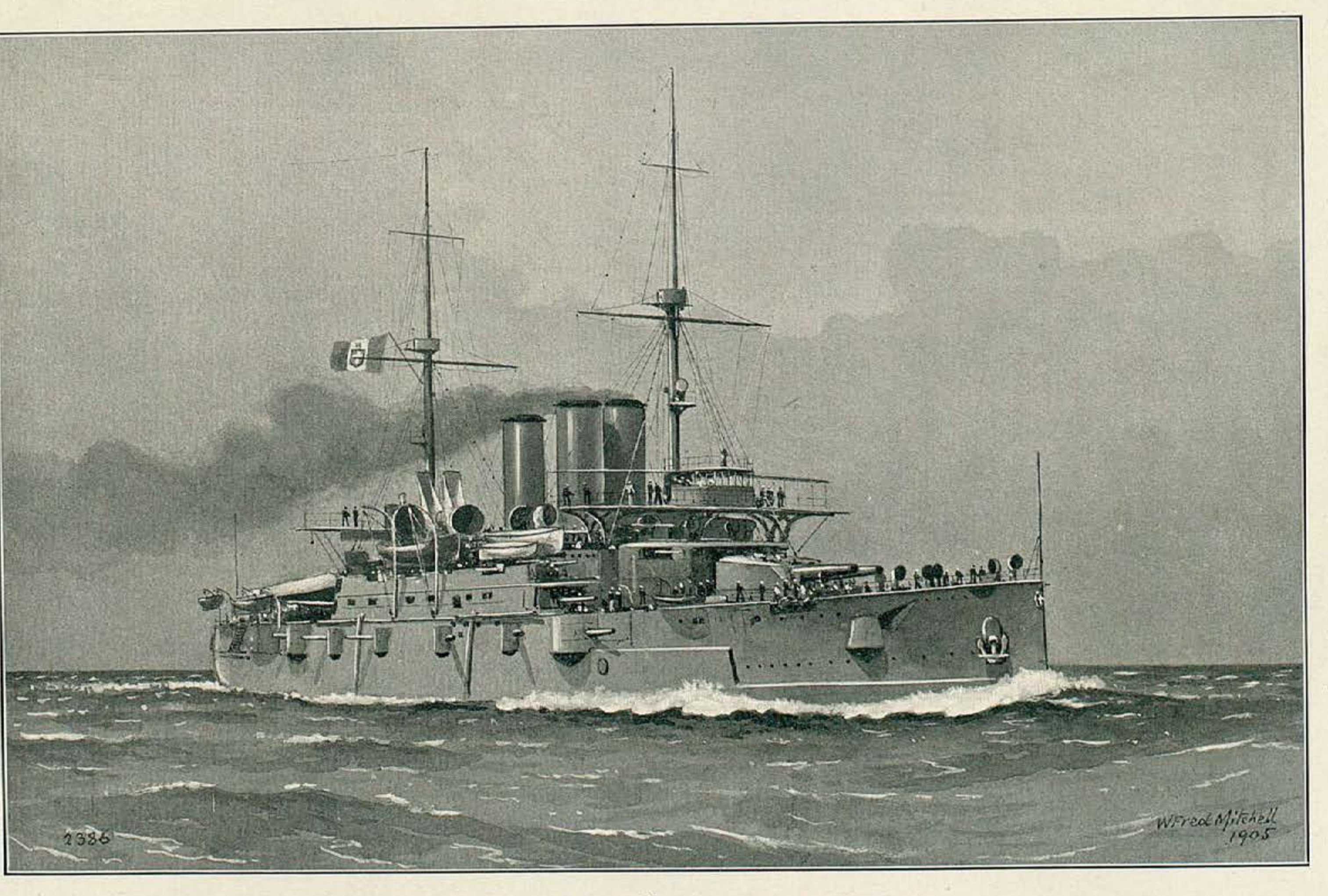
The Navy Estimates for 1905–6 amount to £5,087,642, about the same as last year. The sum to be devoted to new construction is £1,533,000.

Battleships.

The battleship Regina Margherita, 13,214 tons, on her natural draught trials attained a speed of 19·3 knots with 17,782 I.H.P., coal consumption 1·82 lbs. On her full power trials she attained a speed of 20·2 knots with 20,664 H.P., and coal consumption 1·98 lbs. Her armament consists of four 12-in. guns mounted in barbettes forward and aft, four 8-in. guns in casemates on the upper deck, and twelve 6-in. guns in a box battery on the main deck, separated by screens. The maximum thickness of the belt armour is only 6 in.—a serious weakness for a battleship. Armour of the same thickness is carried up to the upper deck, and extends from barbette to barbette, covering a large area of the side. The barbette armour is 10 in. thick. The machinery was constructed by Messrs. Ansaldo at Sampierdarena.

Regina Elena class.

The Regina Elena, 12,425 tons, was launched at Spezia on June 19; the Vittorio Emanuele III. on October 12 at Castellamare. The other two ships of the class are still on the stocks, the Roma at Spezia, and the Napoli at Castellamare. The estimated speed of these ships is 22 knots with 20,000 I.H.P. They are 9 ft. longer than their predecessors, and have 5 ft. less beam. The writer had the opportunity of visiting the Regina Elena, which was completing in the basin, and the Roma, which was still on the stocks at Spezia, last October. They have very fine lines, a long lean entrance with great flare to the bow, a short 'midship section, and a clean run. To the amateur they appear to resemble in form the County cruisers, but with the great advantage that the weights are carried much further from the ends. The armament comprises two 12-in. guns mounted singly in barbettes, one on the forecastle and



ITALIAN BATTLESHIP "REGINA MARGHERITA."

one on the upper deck aft; twelve 8-in. guns mounted in pairs in six turrets. Four of the 8-in. gun turrets are on the upper deck; the centre turret on each side is on the level of the forecastle deck. The guns have thus great command of fire. The forecastle has an extraordinary tumble home in order to permit of the 8-in. guns in the centre and forward turrets being fired right ahead. The end-on fire is therefore very powerful, and comprises one 12-in. and eight 8-in. guns. The 12-in. gun barbettes are protected by 8-in. armour, the 8-in. gun turrets by 6-in. armour. The turret system of mounting gives a far wider arc of fire and better protection for the same thickness of armour than the casemate system. On the other hand, the guns being mounted in pairs, there is always a chance of both being put out of action by a single shot, and the rapidity of fire is less than in the case of guns mounted singly. Protection is given by a belt 9¾ in. thick amidships, covering the engines and boiler spaces, tapering at the lower edges and towards the bow and stern. The area of side protected is far less than in the Regina Margherita. In speed these ships can be classed as armoured cruisers. Their speed has been obtained at the sacrifice of two 12-in. guns, and of some of the protection given in most other first-class battleships. By a sacrifice of 1½ knots in speed, and by some reduction in coal supply, additional protection could have been given. A large coal endurance seems hardly needed under the conditions under which the Italian Navy is likely to be called upon to fight. Though in some respects the Regina Elena and her sister-ships may be little more than armoured cruisers, they cannot be pronounced unfit "to lie in the line."

Cruisers.

The armoured cruiser Francesco Ferruccio, 7294 tons displacement, has been completed.

The armoured cruiser A has been laid down at Castellamare; a sister-ship, B, is to be laid down this year—displacement, 9,842 tons; length, 436 ft.; beam, 69 ft.; draught, 23½ ft. The armament comprises four 10-in. guns, mounted in turrets fore and aft, eight 8-in. guns, mounted in pairs in turrets on the broadside, sixteen 3-in. and eight 1·8-in. guns, and two torpedo tubes. The maximum thickness of the belt is 8 in., and the guns are protected by armour 6 to 7 in. thick. I.H.P. 18,000, estimated speed 22·5 knots. The normal coal supply is 700 tons, and the maximum 1,500 tons. The estimated cost of each ship is £880,000.

Destroyers.

The destroyer Espero, of 30 knots speed, was launched at the Pattison Yard, Naples, on July 9. The Zefiro has also been launched. Sixteen destroyers have been ordered from Messrs. Schichau, of Elbing. Speed in these boats is to be sacrificed, as

in the new English destroyers, to strength and seaworthiness, and is to be only 26 knots.

Trans-ports. The Estimates of 1904–5 included charges for two large collier and liquid fuel transports, the Bronte and Sterope, to be built at Leghorn, and for two gunboats for the lagoons, to be constructed in private yards. The Sterope, which was launched at the Orlando Yard on January 15, 1905, where the sister-ship is in hand, is a somewhat remarkable vessel. She is intended for the transport of naval stores, coal, and liquid fuel, and displaces 9490 tons, with a draught of 24 ft. 6 in.; length, 380 ft. 6 in. between perpendiculars; beam, 47 ft. 6 in. She can carry 6000 tons of coal or material, and has a tank capacity for 4000 tons of liquid fuel. The engines are to be of 3200 I.H.P., or 4000 I.H.P. with accelerated draught, and the speed will be 13½ knots. The engines will be of the triple-expansion inverted type, steam being supplied by four cylindrical boilers, and auxiliary power will be provided for working the cranes and winches. Temperley apparatus is to be installed for coaling in harbour, and Temperley-Miller apparatus for coaling at sea. Liquid fuel can be pumped at the rate of 300 tons an hour.

Sub-marines. The submarine Delfino has been completed. The four submersibles which are building have been named the Squalo, Narvalo, Otaria, and Tricheco.

Man-œuvres. Combined manœuvres took place in September, representing a raid of about 5000 men, with cavalry and artillery, upon the Neapolitan coasts. The troops were embarked in ten transports at Naples, the operation occupying nine hours. The transports were conveyed by warships, and a torpedo attack was driven off. The landing took place on the shore of the Gulf of Pozzuoli, and the defenders were defeated.

RUSSIA.

Losses in war. The war between Russia and Japan is dealt with in a special chapter. The battleships destroyed or captured at Port Arthur include the Sevastopol, Poltava, Peresviet, Pobieda, and Retvisan. The Petropavlovsk was sunk by a mine off Port Arthur on April 13th. The Cesarevitch took refuge at Kiao-Chau after the sortie on August 10th. Of the ten first-class battleships completed for the Russian Navy on May 1st, 1904, six have been lost. On the other hand, four battleships have been completed, viz., the Borodino, Alexander III., Orel, and Kniaz Souvaroff, and they have left, with the Oslabya, for the Far East, constituting Admiral Rozhdestvensky's battle squadron, which went out by the Cape of Good Hope. The Orel ran aground in the Neva on her way down to

Kronstadt for completion. Her back was somewhat strained. The Slava went on November 12th from St. Petersburg to Kronstadt, where she will be completed and receive her armament. It is hoped that she will be ready for sea early this year. The Borodino, Alexander III., Orel, Kniaz Souvaroff and Slava are of 13,516 tons displacement, and have an estimated speed of 18 knots. They are protected by a complete armoured belt, with a maximum thickness amidships of 9 in. This belt is 6 ft. 6 in. in depth. Above the belt the side is protected by 6-in. armour to a height of 10 ft. 8 in. above the water-line. The upper armoured deck is 2½ in. thick, the lower 1½ in. thick. The principal armament comprises four 12-in. guns mounted in elliptical turrets protected by 10-in. armour, the ammunition hoists being protected by 8-in. armour. The secondary armament includes twelve 6-in. guns, which are mounted in pairs in six elliptical turrets protected by 6-in. armour. There are twelve 3-in. guns mounted in a battery on the main deck protected by 3-in. armour, four of the same calibre right aft, and four on the upper deck forward of the 12-in. gun turret. The propelling machinery consists of two four-cylinder triple-expansion engines, which are to develop 16,000 H.P. There are 20 Belleville boilers with economisers. The maximum coal supply is 1250 tons, and oil fuel is also used.

Battle-ships laid down.

The formal ceremony of laying the plate of the Ioann Zlatoust (12,733 tons) took place at Sevastopol on November 13th.

Two battleships, the Imperator Pavel I. and Andrei Pervozvannyi (16,630 tons), are under construction, respectively at the Baltic and Galerny Island yards, at St. Petersburg.

Cruisers. Losses in the war.

The losses in cruisers during the war include the armoured cruiser Rurik, which was sunk by the Japanese during the fight between the Vladivostock squadron and Admiral Kamimura on August 14th; the new armoured cruiser Bayan, sunk in the harbour at Port Arthur; the second-class cruiser Pallada, sunk on August 10th; the Diana, which escaped to Saigon after the battle of the same date; the new cruiser Bogatyr which ran aground off Vladivostock on May 22nd, and the Askold, which escaped to Shanghai after the August sortie; the third-class cruiser Boyarin, which was sunk by a mine off Port Arthur, and the Novik, which was driven ashore by Japanese cruisers in August near the island of Saghalien. The attempt to raise the Varyag, which was sunk at Chemulpho at the outbreak of the war, has failed.

The second-class cruiser Oleg, of 6675 tons and 23 knots speed, has been completed, while her sister-ship the Kagul, of 6645 tons displacement, has undergone her machinery trials.

The Jemtchug attained a speed of 23 knots on her trials.

The gunboat Khivenets, completing at St. Petersburg, is to carry an armament of two 8-in. and eight 3-in. guns; displacement, 1340 tons; speed, 13 knots.

Destroyers. The destroyers Tverdy, Totschny and Trevoshny are building at Abo, and the Grozni at St. Petersburg, where the Gromki and Gromiastchi have been launched. In the Black Sea the Zadorni Zorki, and Zharki have been launched.

Ten gunboats of 175 ft. 6 in. long, 12 knots speed, have been ordered.

New programme. The programme for the expenditure of £160,000,000 on the reconstruction of the Russian Navy is hardly likely to be carried out under present circumstances. It included eight battleships of the Slava type, eight battleships of the Andrei Pervozvannyi type, six cruisers of the Bayan type, six cruisers of an improved Novik type, and six of the Bogatyr type, fifty destroyers of 500 tons, 100 destroyers and torpedo-boats of 350, 240, and 150 tons, ten mine-layers of the Yenisei type, and four floating workshops of the Kamchatka type.

Refits. The old armoured cruiser Pamyat Azova is to exchange her cylindrical boilers for Belleville water-tube boilers. The old cruiser Admiral Korniloff is also to be refitted.

United States.

"There is a man in the White House for the next four years who believes that the American Navy should be the best in the world," are the words used by Mr. Morton, the Secretary of the United States Navy, of President Roosevelt. The number of Americans who hold the same opinion as their President is no doubt increasing; but there is nevertheless a certain conflict of views arising from economic considerations. A powerful party in Congress, representing many interests, is endeavouring to divert money available for naval construction to projects of river and harbour improvement and the erection of public buildings. The Government, however, with the Navy Department and the General Navy Board, firmly resist this tendency, and declare that such a change of policy would be a stupendous and inexcusable blunder. It is noticeable that the Naval Committee of the House of Representatives decided to recommend that two battleships of 16,000 tons should be built instead of three, as proposed by the General Navy Board, while the Navy Estimates for 1905 were reduced from £23,534,493, at which they originally stood, to £20,617,830. Considerable additions are proposed

to the *personnel*, 62,368 men being required to man the ships built and building. The numbers borne in 1904 were 40,743.

Battleships. The United States Navy have at present twenty-six battleships completed, completing, or under construction. The only battleship completed during the past year is the Ohio, of 12,440 tons, which is of the same class as the Maine and the Missouri. The Ohio attained a speed of 17·86 knots on her trials. The contract required a speed of 18 knots, and the contractors therefore became liable to a penalty of £5000. The Missouri alone of these three ships attained her contract speed.

Georgia class. All of the Georgia class have been launched—the Virginia on April 5 at Newport News, the Rhode Island on May 17, and the New Jersey on November 10 at Fore River, the Georgia on October 11 at Bath, Maine, and the Nebraska on October 7 at Seattle. The Georgia class are of 14,948 tons displacement and 19 knots speed. They carry an armament of four 12-in., eight 8-in., and twelve 6-in. guns, and are protected by a belt of a maximum thickness of 11 in. Their complement is 40 officers and 772 men.

Connecticut class. The Connecticut class, of 16,000 tons trial and 17,200 tons full load displacement, comprises six ships, of which the Connecticut was launched at the Brooklyn Navy Yard on September 29 and the Louisiana at Newport News on August 27, while the New Hampshire has been laid down at the yard of the New York Shipbuilding Co. These vessels have already been described in the *Naval Annual*. Their speed is to be 18 knots, as compared with the 19 knots of the Georgia class, but their secondary battery includes 7-in. instead of 6-in. guns, and they carry twenty 3-in. guns instead of twelve. The New Hampshire, fitted as a flagship, is to have a complement of 41 officers, 875 men, and 60 marines. The contract price of the hull and machinery of these ships is about £800,000; the total cost, including armour and armament, is £1,600,000.

Idaho class. The two battleships of 13,000 tons displacement have not made much progress. The Idaho is building at Cramp's, the Mississippi at Newport News. They carry the same armament as the Connecticut class, at a sacrifice of 1 knot in speed. They are very powerful ships.

Kentucky's passage. Last year we mentioned the passage of the Kearsarge across the Atlantic—from the Needles to Bar Harbour, at an average speed of 13·1 knots—as the most remarkable ever made by a battleship. Her performance has been eclipsed by the Kentucky, which made the passage from Madeira to New York at an average of 13·8 knots. It is probable, however, that she experienced finer weather than the Kearsarge.

Armoured cruisers.

Of the armoured cruisers of 13,680 tons displacement, the Colorado and Pennsylvania, built by Messrs. Cramp, attained on trial speeds of 22·27 knots and 22·43 knots respectively; the Maryland and West Virginia, built at Newport News, 22·4 and 22·15 knots. All these ships are to be in commission by July as a cruiser squadron. The California, of the same class, was launched at the Union Ironworks on April 28, 1904.

Tennessee class.

Of the larger class of 14,500 tons, the Tennessee was launched at Cramp's Yard on December 3, and the Washington on March 18, 1905, while the North Carolina and Montana have been laid down at Newport News, the contract price for the hull and machinery being £715,000, and the price, including armour but not armament, £970,630.

The Milwaukee, of 9700 tons displacement, was launched from the Union Ironworks on September 10.

The third-class cruiser Chattanooga, 3200 tons, averaged 16·6 knots on a continuous run of four hours on the Cape Ann course.

Scout cruisers.

Three scout cruisers, named the Birmingham, Chester and Salem, have been laid down. Their dimensions are as follows: Length between perpendiculars, 420 ft.; beam, 46 ft. 8 in.; draught fully loaded, 18 ft. 3 in., with a displacement of 4310 tons; draught on trial, 16 ft. 10 in., with a displacement of 3750 tons; speed 24 knots, with 16,000 I.H.P. There will be twelve water-tube boilers. The protective deck is of nickel steel 1½ to 2 in. thick. The armament comprises twelve 3-in. guns and two submerged torpedo tubes. The complement consists of 16 officers and 368 men. The coal supply is to be sufficient for a steaming radius of 5000 miles.

Programme.

The General Navy Board in its report to the Secretary of the Navy, dated October 28, recommended the following programme of new construction:—

3 Battleships	£1,594,650	each
5 Scout Cruisers	452,674	„
6 Destroyers	154,320	„
2 Squadron Colliers . . .	298,353	„
6 Torpedo-boats	20,576	„

1 Gunboat of the Helena class.

2 small gunboats for service in the Philippines. Also that the expenditure on submarines of the £170,000 appropriated by the Act of April, 1904, be expedited. The Naval Appropriation Act, however, as passed by the House of Representatives, provides for laying down only two battleships, as was recommended by the Naval Committee of the House.

Extract from General Navy Board Report.

Regarding the estimates for three new battleships, the General Board says:—"In order to secure the homogeneity of squadrons, and since the battleships now authorised will be intended to combine in squadron with the Connecticut class, the General Board recommends that their displacement, speed, steaming radius and manœuvring qualities be the same as the Connecticut. Having fixed upon the Connecticut as the standard as to displacement and dimensions, there should be no departure from that vessel in the concomitant tactical features of speed and steaming radius without grave reasons, which do not appear to exist. Certainly no less speed than her 18 knots can be considered; and an increase, such as the 19 knots of the five smaller Georgias, can be obtained only by a material sacrifice in some other direction, which is not desirable. It is true that the five smaller Georgias, if associated in squadron with three 18-knot Connecticuts, would, as pointed out by the tactical committee of the Naval War College, lose the advantage of that tactical quality for which a sacrifice has been made in other features; but the General Board considers that to be a less evil than to make any sacrifice in guns or armour of new vessels. Moreover, the Connecticut's speed will probably differ less than one-half knot from the Georgia's. If by reason of improvements in engines or boilers or hull design, the same speed, 18 or 18½ knots, can be obtained with less weight of machinery, the General Board is of the opinion that it would be still better to ensure only that speed and utilise the saved weight in additional armour and armament.

"The only feature in which a departure should be made from the Connecticut are the armour and armament. It is not essential that the gun powers of different ships of a squadron should be identical, provided they do not differ so as to affect the relative strength of end-on and broadside fire. And a superiority in end-on fire, for instance, is not to be deprecated unless accompanied by a corresponding diminution of broadside fire. The greater accuracy at long ranges of heavy guns as compared with lighter ones, their relatively as well as positively increased rapidity of fire, their greater collective effectiveness against armoured ships, and the evidence furnished by the war in the East that naval battles will be most often fought at long ranges, all point to increasing the number of heavy guns at the expense of the intermediate battery.

"Examination of the damage sustained by the Russian ships reveals a reported great preponderance of hits from heavy guns. It is true that any error in the estimation of sizes must be in the direction of the larger calibre. Steel plates do not close behind a shot as did wooden sides, but all holes are larger than the shot that

make them—especially in the instances under consideration, because the exceedingly sensitive Japanese fuses make their shell burst while going through the side. Nevertheless, considering that the long fighting ranges were near, if not beyond, the limit of the smaller guns' power, and that the accuracy of the bigger gun is naturally the greater, there seems no reason to doubt the general correctness of the reports.

"The General Board is of the opinion that we should not defer making this change in the armament of battleships. Incidentally it cannot fail to simplify the problems of ammunition supply and fire control, both of which powerfully influence rapidity and accuracy of fire. The General Board therefore recommends that, if found practicable, the battleship be given a battery of heavy turret guns, none of which shall be less than 10 in., and at least four of which shall be 12 in., without intermediate battery; the secondary battery to be unprotected by armour, the smoke pipe and air ducts to be protected, if possible, as far as the upper deck by heavy armour. There should be no needless multiplication of calibres, and no introduction of new calibres, such as 9-in. or 11-in. guns. Furthermore, the change in battery from existing types must not entail any increase of weight to be compensated by diminished armour or coal; but rather, on the contrary, any weight saved should be added to the protection of flotation, stability, and steering gear. Finally, the increased ammunition supply necessitated by the increased rapidity of fire of heavy guns should be borne in mind. The battleships should carry submerged torpedo tubes, one on each side, or preferably two on each side.

"The foregoing description of the new battleship's battery is expressed in somewhat general terms; but it cannot be made more specific until the Bureau of Construction and Repair has completed the tentative design asked for by the General Board on January 26, 1904."

The Report of the Bureau of Construction contains the following observations on battleship design:—

Bureau of Construction Report.

"The Bureau of Construction now has in course of preparation designs of three arrangements of battery intended to embody the ideas above noted, with the exception of the heavy armour for smoke pipes, the weight of which is prohibitive in view of the other qualities deemed essential. Certain definite advantages due to a large number of heavy guns are not disputed, and the present trend of naval opinion seems to be in the direction of such a battery. In view of the opinion of the General Board upon this point and the present tendency in foreign navies, the Bureau of Construction is of

the opinion that it is expedient to develop a battleship carrying a battery of the general description proposed by the General Board. In this connection, however, it seems proper to remark that such a battery arrangement is by no means new or untried, and that as one of the more recent instances it may be noted that Germany is now reconstructing four battleships, designed more than twelve years ago for an armament on this principle.

"Among the disadvantages of the concentration of the battery in guns of large calibre, omitting the intermediate battery, may be mentioned the difficulty of obtaining suitable space for the magazines of at least two of the heavy gun turrets; the serious increase in tensile stresses on the upper deck, which, in one of the designs so far treated, involves an increase of nearly 100 per cent.; and the non-utilisation for battery of the large armoured area amidships, this armour being, however, absolutely necessary for the protection of the stability of the vessel and the vital parts of the hull and machinery."

The destroyers recommended were of the Truxtun type, of strong construction and with a powerful battery, the trial displacement of which with half their full coal supply and two-thirds of their ammunition and stores would be 620 tons. These, however, have not been included in the Naval Appropriation Act. Destroyers.

The Squadron colliers are to carry 5500 tons of coal, and to be fitted to carry also oil, ammunition, and stores for the Fleet. Their displacement is to be 12,500 tons, and their speed 16 knots.

The light-draught gunboats Paducah and Dubuque, of 1085 tons displacement and 12 knots speed, have been launched at Morris Heights. Gunboats

The steel training ships Cumberland and Intrepid and the training brig Boxer have been launched. These ships are propelled by sail power only. Training ships.

There are now nine firms in the United States capable of undertaking the construction of battleships. Owing to the slackness in orders for the Mercantile Marine, firms have been induced to tender for ships for the Navy at unremunerative prices, with the result that some have got into financial difficulties. Mr. Schwab, ex-President of the Steel Trust, is now said to control, besides the Bethlehem Works, the shipyards of Bath, Me.; New London, Conn.; Newport News, Va.; San Francisco, and Elizabeth, N.J.; and to be in a position to contract for building ten battleships at once. Private ship-yards.

A terrible explosion occurred on board the battleship Missouri during target practice on April 13, 1904, by which thirty-two officers and men lost their lives. The Court of Inquiry arrived at the following finding:— Missouri explosion.

"That the cause of the said accident was the unexpected ignition of the two sections of the charge of smokeless powder then in the gun, by what is termed throughout the proceedings a 'flare-back,' a flame resulting from the ignition, in some manner not yet known, of residual gases attendant upon the combustion of the smokeless powder now in use. That the flame from these sections ignited the two other sections then in the ammunition car, and that a shower of burning powder grains from these sections in the turret was projected down the open trunk, which connects the turret with the 12-in. handling room, igniting there eight other sections of the smokeless powder (two charges) which had been taken out of the magazines and were in that place. The said accident in said vessel was, on the occasion named, in no respect due to fault or negligence on the part of any of the officers or members of the crew of said vessel."

JAPAN.

Losses in the war.

Of the six battleships which Japan possessed at the outbreak of the war two have been lost. The Hatsuse, one of the group of four battleships recently built in England, was sunk by contact with floating mines off Port Arthur on May 15. The Yashima, sister ship to the Fuji, was seriously injured if not sunk by mines in June. The Yashima was of 12,320 tons displacement, and was completed in 1897. Both the Hatsuse and Yashima were built at Elswick. For many months no positive intimation of the loss of the Yashima appeared in the newspapers—an illustration of the effective Press censorship exercised by the Japanese. The old coast-defence ship Heiyen was also sunk by a mine.

The protected cruiser Yoshino, likewise an Elswick-built ship, was rammed and sunk by the Kasuga on the same night that the Hatsuse was lost. She was completed in 1893, had a speed of 23 knots, and was one of the most remarkable cruisers of her day. The small cruiser Miyako, completed in 1901, was sunk by coming in contact with a floating mine off Port Arthur in May, but has since been raised. The Sai-yen, 2264 tons, one of the vessels captured from the Chinese, has also been lost.

To compensate for these losses, the Japanese may be able to raise and utilise the battleships Poltava and Peresviet, and the cruisers Bayan, Pallada, and Boyarin, but this is still doubtful.

New construction.

In Part IV. of the *Naval Annual* for last year we published a plate and description of the battleship Katori, under construction by Messrs. Vickers, Sons & Maxim at Barrow. The Kashima, of slightly different dimensions, was launched on March 22, at Elswick. The

displacement of the Elswick ship is 16,400 tons, and of the Barrow ship 15,950 tons. The following description of the Kashima is abridged from the *Times*:—

The length on the water-line is about 425 ft.; breadth, 78 ft. 2 in.; draught, 26 ft. 7½ in.; displacement, 16,400 tons. Main armament, four 12-in. guns twin mounted in barbettes, four 10-in. guns mounted singly in barbettes, twelve 6-in. guns carried in the citadel, twelve 12-pdr. guns, six Maxim guns, three 3-pdr. guns, and five torpedo tubes. The 12-in. guns will weigh approximately 59 tons each. The length is 46 ft. 9½ in. (46·7 calibres). The weight of the projectile is 850 lb. No armour which any ship can carry can hope to cope with their penetrating power at 3000 yards. The 10-in. guns will weigh approximately 34 tons each. The length is 39 ft. (46·76 calibres). The weight of the projectile is 500 lb. The charge will be cordite, probably of the modified type. The penetrating power of these guns is equal to the penetrating power at 3000 yards of any of the 12-in. guns at present afloat in any Navy. The length of the 6-in. guns is 23 ft. 6 in. (approximately 47 calibres). The disposition of this armament has been arranged so as to ensure that there will be no interference with one another in the firing of the different guns, each of which possesses a considerable arc of training, the 12-in. guns being 26 ft. and the 10-in. guns 22 ft. above the water-line, whilst the 6-in. guns in the battery are about 14 ft. above the water-line. The disposition of the armour protection adopted in the latest and most powerful battleships has been followed in this vessel. The armour amidships is carried from below the water-line up to the upper deck. Above this deck additional protection is afforded by a 4-in. screen rising to a height of 7 ft. 6 in. above the upper deck, covering the 6-in. gun positions amidships as well as the spaces between the 10-in. gun positions. The main armour belt has a thickness of 9 in. for more than half her length, and extends the whole length of the vessel, tapering slightly at the extremities. This belt extends to 5 ft. below water and 2 ft. 6 in. above water. Surmounting it is a belt of armour extending in length from the after 12-in. barbette right forward to the stem. This belt is 9 in. thick amidships and tapers to 4 in. at the ends. Immediately above this 6-in. belt is the 6-in. citadel armour, reaching to the upper deck, and enclosing the two 12-in. barbettes. Within this citadel are placed ten of the 6-in. guns, separated from each other by screens of 80-lb. armour plating; these guns fire through ports similar to those in casemates. The other two 6-in. guns fire through similar ports in the 4-in. screen armour on the upper deck amidships. The barbette armour of the 12-in. guns has a thickness of 9 in. on the upper or exposed portions, and a thickness of 5 in. where protection is afforded by the citadel armour. The thickness of the 10-in. gun barbette armour is 6 in., that of the conning tower armour 9 in., and the observer tower 5 in. In addition to these protected positions for commanding officers, two more officers' shelters will be provided of 3-in. armour; these will be placed on the boat deck amidships. The steel protective deck running throughout the entire length of the vessel, and covering the whole of the machinery, magazines, etc., has a thickness of 2 in. on the flat portions amidships and 3 in. on the sloping sides. The sides of this deck are carried down and join the bottom of the main armour belt. At the extremities of the vessel where the armour protection is reduced this deck is 2½ in. thick all over. Further protection is given to the upper structure of the vessel by thick protective plating worked on top of the screen armour at the level of the boat deck.

Independent magazines are provided for each pair of 12-in. guns and for each 10-in. gun, whilst the 6-in. and smaller Q.F. guns obtain their supplies of ammunition from a passage running right round the machinery spaces below the protective deck. The torpedo tubes are located in watertight chambers, two forward and two aft, firing on the broadsides, and one tube firing right astern, also under water. The protection afforded to the engines and boilers of the vessel by the side armour and protective deck is increased by the arrangement of the coal bunkers, which are designed so as to minimise labour in trimming and in getting the coal to the furnaces. The full supply of coal has been provided for without using the wings, which really form part of the double bottom, so that the difficulties attending the working of the coal into and out of these small spaces are avoided. As regards the longitudinal coal bunkers at the sides of the boiler rooms and below the protective deck, these also can be kept closed during action, thereby affording additional protection against torpedoes. A significant feature of the coaling arrangements of this vessel is presented by the fact that the bulk of the coal can be brought to the stokeholds without opening any of the doors in the main watertight bulkheads, whilst, in addition to the coal bunkers below the protective deck reserve bunkers are arranged at the slopes on this deck to the height of the main deck throughout the

D 2

length of the machinery spaces. The total coal bunker capacity of this vessel is approximately 2000 tons.

An efficient arrangement of torpedo net defence will also be provided around the greater part of the vessel. The total complement will be about 980. The main propelling machinery and boilers are being manufactured by Messrs. Humphrys, Tennant, & Co., London. There are 20 Niclausse boilers, arranged in three separate boiler rooms. The estimated speed is 18½ knots, with 15,600 I.H.P.

The third-class cruisers Niitaka and Tsushima, 3365 tons displacement, and also the Otawa, 3000 tons displacement, have been completed in Japan. Two river gunboats, the Sumida and Fushima, 126 tons, are under construction.

Of destroyers the following are building or projected in Japan: seven at Yokosuka, seven at Kure, four at Sassebo, two at Maizuru, three at Nagasaki, three at Kawasaki (Kobe), and two at Osaka. They are larger than the existing boats, and the speed is to be 27–28 knots.

New programme. The following announcement of a new naval programme was made by the special correspondent of the *Daily Telegraph* on January 27, but has not yet received confirmation.

The Japanese Government has decided to lay down immediately at Yokosuka one battleship of 19,000 tons, with a speed of 18·25 knots, and an armament of four 12-in. guns, twelve 10-in. guns, and twelve 4·7-in. guns. At Kure, two armoured cruisers, each with four 12-in. guns and six 10-in. guns, are to be built. The keel of one cruiser has already been laid down, and the remainder of the ships will be commenced shortly.

There is also under consideration the construction of a cruiser of 12,000 tons.

All future ships are to be heavily armed, all guns below 10-in. being discarded, as the lesson of the war clearly shows that long-range guns can alone be effective in future naval warfare. These experiments in building large warships, the first of their size and class to be constructed in Japan, will be closely watched by experts.

The destroyer and torpedo-boat flotillas, which have suffered greatly during the war, are to receive many additions. Fifteen submarines are to be provided this year. Ten of these have already arrived on board ships. They then anchored at Yokohama, and proceeded to Yokosuka at night time, being back at Yokohama before morning. They were under the control of American instructors.

Negotiations were recently opened for the purchase of a Chilian cruiser, and a navigating crew has already left Japan. Great secrecy is maintained with reference to these preparations.

Austria-Hungary.

Estimates The Extraordinary Navy Credit for 1905 amounts to £2,611,500, of which £850,000 are required for new ships, £637,000 for the torpedo flotilla, £125,000 for submarine boats, £437,000 for ammunition, £50,000 for patrol boats, etc., £273,000 for naval guns, and £239,000 for harbour works, coal, etc. The Ordinary Estimates for 1905–6 amount to £1,796,434. The vote for new construction amounts to £848,000, of which £48,600 is on account of the armoured cruiser St. Georg, £175,000 for the battleship Erzherzog Karl, £179,000 for the Erzherzog Friedrich, £146,000 for a third battleship C, £85,000 for torpedo-boats to replace second and third-class

torpedo-boats. The Ordinary Estimates for 1905 show an increase of £142,916 over those for 1904.

The Erzherzog Friedrich, sister ship to the Erzherzog Karl and the Ersatz Novara, was launched at Trieste on April 30. The ships of this class carry a very powerful armament for their size, comprising four 9·4-in. guns mounted in pairs in turrets forward and aft, and twelve 7·5-in. guns, of which eight are mounted in a central redoubt on the main deck protected by 6·8-in. armour, and four on the upper deck in turrets. The original secondary armament proposed for these ships comprised eight 7·5-in. guns and six 6-in. guns. Four 7·5-in. guns have thus been substituted for the six 6-in. guns. The maximum thickness of the belt is 8·2 in., and the armour on the principal turrets is 9·4 in. thick. The transverse bulkheads are 8 in. and the armoured deck 3 in. in thickness. The Erzherzog Friedrich is to be fitted with Yarrow large-tube boilers, and the estimated speed is 19·25 knots with 14,000 I.H.P. The coal supply will be 1315 tons, which will give a radius of action of 4500 miles. Erzherzog Friedrich.

A 28-knot destroyer, of 384 tons, and a 25-knot torpedo-boat, of 197 tons, are in hand at Poplar.

Argentine Republic.

The report that the Argentine Government intended to sell three cruisers of the Garibaldi type to Russia is declared by the Minister for Foreign Affairs to be absolutely without foundation, in a letter addressed to the Argentine Minister in London on December 10.

Brazil.

A programme of new construction has been drawn up for the Brazilian Navy and adopted by the Congress. It includes three battleships of about 13,000 tons, three armoured cruisers of 9500 tons, six destroyers of 400 tons, six torpedo-boats of 130 tons, six torpedo-boats of 50 tons, three submarines, and one transport of 6000 tons. The majority of the ships are to be built in England.

Four river gunboats are under construction by Messrs. Yarrow, of Poplar; speed, 12 knots.

China.

The protected cruiser Hai-Tien, of 4300 tons displacement and 24 knots speed, which was completed at Elswick in 1899, went ashore at Eagle Point, 60 miles from Shanghai, in April last.

Denmark.

The Peder Skram, a sister of the Olfert Fischer and Herluf Trolle, coast defence armour-clads, has been laid down.

Greece.

The programme for the construction of some new armoured vessels for the Grecian Navy has been postponed.

Mexico.

The two gunboats built at Elizabeth Port, the Vera Cruz and Tampico, have made their trials. They are of 980 tons displacement and 2400 I.H.P. Both practically attained their designed speed of 16 knots.

Two gunboats, the Bravo and Moreros, are being built by Messrs. Odero, of Sestri-Ponente. They are 1200 tons displacement, and their dimensions are as follows: Length, 248 ft. 3 in.; beam, 33 ft. 10 in.; draught, 10 ft. Their estimated speed is 17 knots with 2600 I.H.P. The coal supply will be sufficient for 5000 miles at 10 knots.

Netherlands.

The small battleship De Ruyter attained a speed on her trials of 16·55 knots with 6377 I.H.P.

The small battleship Tromp, 5211 tons displacement, was launched on June 15th, and is to be completed at the end of this year. Speed, 16 knots; armament, two 9·45-in., four 5·9-in., and ten 2·95-in. guns. The maximum thickness of the belt armour is 5·9 in.

The coast defence battleship E, laid down at Amsterdam, is to carry the same armament.

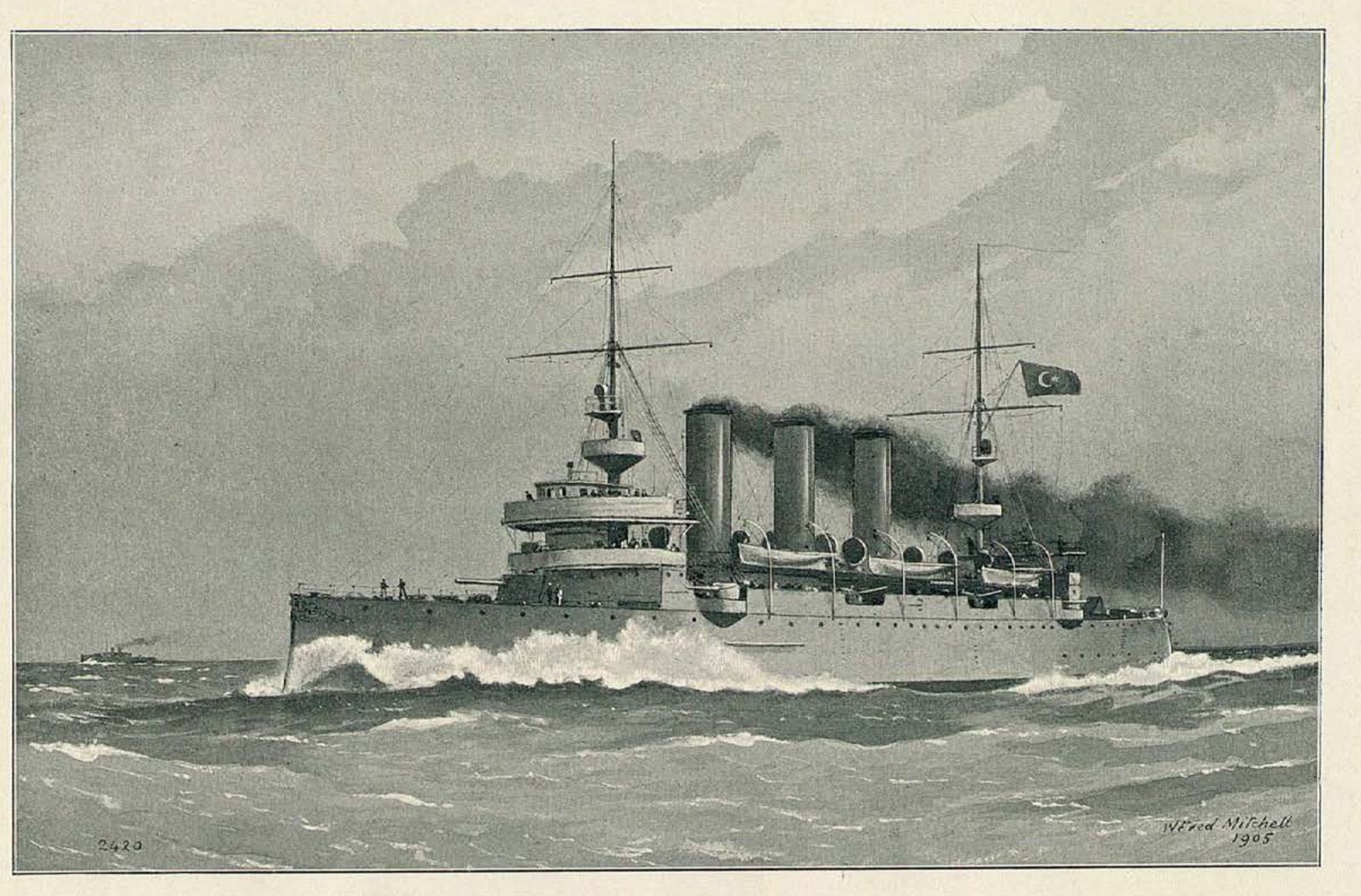
During 1905 four torpedo boats, G1 to G4, and one submarine are to be completed, and four torpedo boats of the Ophir type are to be laid down.

Norway.

The torpedo boats Orc and Ravn attained a speed of 23·5 and 22·5 knots respectively on their trials.

Sweden.

The Swedish Navy programme of 1901, which was to have been completed by 1906, has fallen so far in arrear that an increased



TURKISH CRUISER "ABDUL HAMID."

grant for 1905 is asked for by the Admiralty in order to ensure the completion of the programme by 1907. The sums asked for are as follows: For completing the ironclad Oskar II, £140,000; first instalment for a new armoured cruiser of Fylgia type, £123,300 (total cost, £385,700); completion of a torpedo-boat destroyer, £33,400; two torpedo-boat destroyers, £133,500; first instalment for five large torpedo-boats, £55,100; nine small torpedo-boats, £99,100; training vessel, £11,600; reconstruction of the Loke, £29,800; reconstruction of the Hildur, Björn, and Gerda, £28,050; three guard boats, £14,100; torpedoes, £8250; enlarging and building torpedo workshops, £30,350; coast fortifications, £158,500; coast artillery, £16,200; balloon shed, £2950.

The coast defence ship Manligheten, of 3612 tons, made her trials in December. She maintained a speed of 16 knots for five hours with 7400 H.P. The maximum speed attained was 17 knots.

The armoured cruiser Fylgia is of 4100 tons displacement; complement 350.

A destroyer has been ordered from Messrs. Thornycroft similar to the Shirakumo, built by them for the Japanese Government; displacement about 350 tons; speed 30½ knots.

The Estimates for 1905 amount to £717,600, an increase of £20,019 over those of 1904, and an increase of £471,247 in the vote for new construction.

Turkey.

The protected cruiser Abdul Hamid, of 3800 tons displacement, built at Elswick, attained a speed of 21·1 knots on her natural draught, and 22·25 knots on her forced draught trials.

The Abdul Medjidieh, built by Messrs. Cramp, at Philadelphia, attained a speed of 22·29 knots on the measured mile. She is of 3432 tons displacement. The armament is the same as that of the Abdul Hamid. The Abdul Medjidieh has arrived in Turkey.

Two destroyers, named the Eliagot and Ac-Hisar, built by Messrs. Ansaldo, of Leghorn, attained a speed of 27 knots on their trials.

Seven torpedo boats of 24 knots speed have been ordered from Messrs. Ansaldo.

T. A. Brassey.
John Leyland.

CHAPTER III.

Comparative Strength.

Redistribution of British Naval Strength.

The redistribution of British naval strength, and the removal from the active list of the Navy of a large number of the vessels not fully effective for war purposes, which have hitherto been maintained in commission on foreign stations, are the most notable features in the year under review. In the *Naval Annual* of 1902 and 1904 we urged that the naval forces of Great Britain were ill-distributed, having regard to the great change in the distribution of the naval strength of our possible enemies. The fact that France, instead of keeping, as she used to do a few years ago, all her most modern and most powerful ships in the Mediterranean, had transferred a considerable proportion of these to the Channel, and the great expansion of the naval forces of Germany and Russia, whereas that of France had practically stood still, were the chief new factors in the situation, on the ground of which we suggested it was desirable to strengthen the British Channel Fleet at the expense of that in the Mediterranean. This view, which was severely criticised in the Press at the time, has now been accepted by those responsible for the administration of the Navy. The outcry which has been raised in Germany at the action of the British Admiralty appears somewhat unreasonable. The steps which are being taken can be justified from the change in French naval policy alone, as the table given below will show; but even if this were not the case, it is clear that the distribution of the British naval forces must be governed by that of the forces of all our possible enemies.

The following table gives the number of battleships in commission in European waters for the British, French, and German Navies, for the years 1894, 1899, 1903–4–5 :—

	BRITISH.				FRENCH.					GERMANY.
	Mediterranean.	Channel.	Home.	Total.	Mediterranean.			Northern Squadron.	Total.	—
					Active Squadron.	Reserve Division.	Total.			
1894	10	4	3	17	8	6	14	6	20	—
1899	11	8	10	29	6	9	15	6	21	7
1903	14	6	10	30	6	3	9	5	14	8
1904	12	8	8	28	6	2	8	6	14	9
1905	8	8	12	28	6	3	9	6	15	12

First Lord's Memorandum.

The change in the distribution of our naval forces, which has been for some time in progress, is explained in the Memorandum presented to Parliament by the First Lord of the Admiralty, the chief points in which may be summarised as follows:—

The present Home Fleet is to be known as the Channel Fleet, and is to consist of twelve modern battleships and a sufficient number of cruisers. Its headquarters to be at home; its station Home waters.

The present Channel Fleet is henceforth to be known as the Atlantic Fleet, and is to consist of eight modern battleships and a proper complement of cruisers. Its permanent base is to be at Gibraltar, and all its repairs will be effected there.

The Mediterranean Fleet will consist of eight battleships and a cruiser squadron. Its base will still be at Malta.

Objections to new scheme of distribution.

The new scheme of redistribution,* so far as it concerns the reduction of the Mediterranean Fleet and the strengthening of the Home and Channel Fleets, is on sound lines; but the decision to establish a new command between the Mediterranean and Home commands, and to base the Channel (now the Atlantic) Fleet on Gibraltar—a decision partly influenced, without doubt, by the fact that, having spent over £5,000,000 on the harbour and dockyard, it was necessary to show that this enormous expenditure had not been wasted—are opposed to principles which have long been accepted in the British Navy. One of the bases of the Mediterranean Fleet has hitherto been Gibraltar, at which, on war becoming imminent, the Commander-in-Chief in the Mediterranean would immediately concentrate his fleet. The objections to the creation of the new command are to some extent neutralised by the decision to place the Atlantic Fleet twice a year under the Admiral in command in the Mediterranean; but the creation of a dockyard at Gibraltar cannot be held a sufficient reason to justify cutting off the Mediterranean Fleet in time of peace from its chief base in the event of war. To make an arrangement which would have to be altered on the first whisper of war cannot be sound policy. The repairs of the Atlantic Fleet could, moreover, be more economically carried out in the Home dockyards.

Cruiser squadrons

In European and Atlantic waters there will be four cruiser squadrons, the First and Second of which will each consist of six armoured cruisers, attached to the Channel and Atlantic Fleets respectively. The Third will consist of the large cruisers on the Mediterranean Station. The Fourth will be a Particular Service Squadron, with the Atlantic for its cruising ground, and its headquarters, when at home, Devonport. It will be placed under the command of the Commander-in-Chief of the present North American

* *Cf.* Lord Brassey's letter to *Times*, 1901, at end of Part IV.

Class.	GREAT BRITAIN. Mediterranean Fleet.	Atlantic Fleet.	Channel Fleet.	FRANCE. Mediterranean Fleet. Permanent Squadron.	Reserve.	Northern Squadron.	GERMANY. Active Battle Fleet.
Battleships . .	Bulwark Formidable Implacable Irresistible London Prince of Wales Queen Venerable	Edward VII. Cæsar Illustrious Magnificent Majestic Mars Prince George Victorious	Hannibal Albemarle Cornwallis Duncan Exmouth Montagu Russell Swiftsure Triumph Revenge Royal Oak Royal Sovereign	Iéna Bouvet Suffren Charlemagne Gaulois Saint Louis	Brennus Charles Martel Hoche	Carnot Jauréguiberry Masséna Henri IV. Bouvines Tréhouart	1st Squadron. K. Wilhelm II. K. Karl der Grosse Mecklenburg Wittelsbach Zähringen Wettin 2nd Squadron. K. Friedrich III. K. Wilhelm der Grosse Braunschweig Elsass Weissenburg Worth
Cruisers, 1st Class .	3rd Squadron. Leviathan Aboukir Lancaster Suffolk	2nd Squadron. Drake Berwick Cornwall Cumberland Essex	1st Squadron. Good Hope Bedford Donegal Kent Monmouth	Marseillaise	..	Condé Gloire Amiral Aube	Friedrich Karl Prinz Heinrich
Cruisers, 2nd Class .	*Diana *Juno *Minerva *Venus	*Doris	*Dido	Desaix Kleber	Pothuau	‡Dupleix ‡Jurien de la Gravière	
Cruisers, 3rd Class .	..	..	*Topaze	Du Chayla Galilée Linois	..	Forbin ‡Troude	Arcona Hamburg Frauenlob Ariadne Amazone Medusa
Torpedo-Gunboats .	†	‖	‖	Condor	..	Cassini	..
Destroyers . .	40	..	44¶	6	1	7	12
							In Reserve—8 Siegfried Class

* Attached ships. † Four torpedo gunboats have been withdrawn and are to be replaced by 4 scouts. ‡ Atlantic squadron. ‖ Two scouts to be added.
¶ Includes Portland and Dockyard port flotillas.

and West Indies Station, and will consist of his flagship, together with other modern ships, which will be allocated in peace time to the training of cadets and boys, and to the training service in connection with gunnery, torpedo, and navigation schools, such ships being capable of immediate adaptation to all purposes in an emergency.

The Particular Service Squadron consists at the present moment of one first-class and five second-class cruisers (four of these being training-ships for boys or cadets), and the new third-class cruiser Diamond, which can be immediately reinforced in war time by the four Edgar class, now used as gunnery training ships at the Home ports. The Fleet in Commission in Reserve comprises eight battleships, of which four are emergency ships, ready to replace any ships temporarily withdrawn from our principal European Fleet.

	Sheerness—Chatham.	Portsmouth.	Devonport.
Battleships . .	Ramillies (E) Repulse (E) Resolution	Canopus (E) Goliath (E)	Commonwealth Empress of India Hood (E) (E)
Cruisers, 1st Class .	Argonaut Diadem (E) King Alfred (E) Spartiate	Powerful (E) Terrible (E) Cressy	Europa (E) Niobe (E)
Cruisers, 2nd Class .	Edgar Vindictive	..	Blake Arrogant Eclipse
Cruisers, 3rd Class .	Pioneer Pyramus	Indefatigable Pandora	Flora *Diamond
Torpedo-Gunboats .	Speedy	..	..
Destroyers . .	20	12	16
Torpedo-Boats . .	5	12	10

(E) Denotes emergency ship. * Denotes without nucleus crew.

The composition of the British Fleets in European waters is set out in the table, in which the ships maintained in commission by France and Germany are, as usual, included. The Mediterranean Fleet now consists of eight homogeneous battleships. As the battleships of the King Edward VII class are completed they will be commissioned in the Atlantic Fleet, the Majestic class being transferred to the Channel Fleet, which will thus consist of six Duncans, four Majestics, and the Swiftsure and Triumph. The First and

Fleets in European waters.

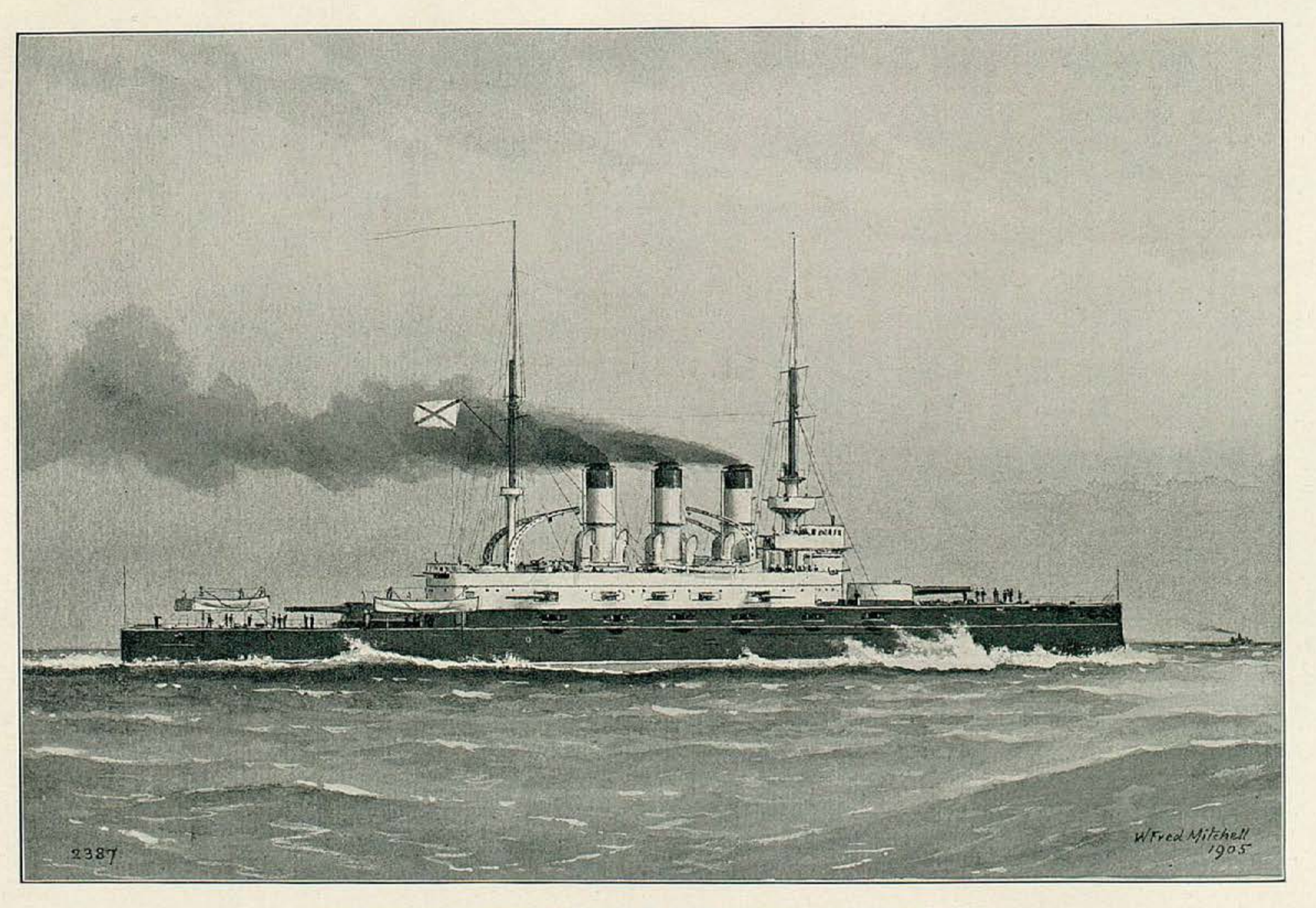
Britain.

Second Cruiser Squadrons will respectively be strengthened by the Lancaster and Suffolk, when two of the Devonshire class are completed to take their places in the cruiser division of the Mediterranean Squadron. When these changes have been carried out we shall have four of the Royal Sovereign class available in case of war, in addition to the ships of the newly established Fleet in Commission in Reserve, which are given in the table on page 43.

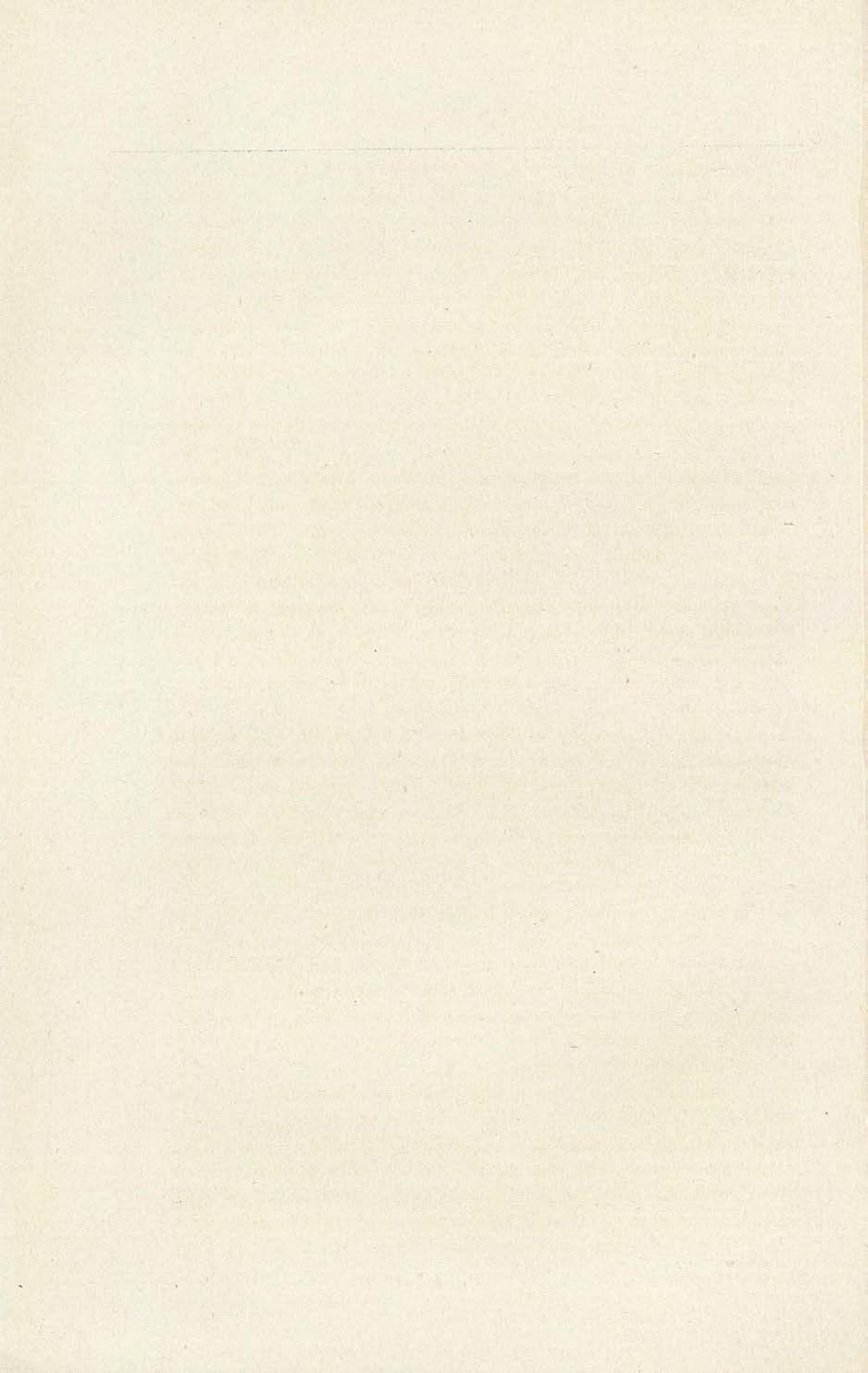
France. The French Mediterranean Fleet consists of the same six battleships in the Permanent Squadron and the same two ships in the Reserve Squadron as last year, to which the Hoche has been added. Three of the new armoured cruisers have been added to the Permanent Squadron, in place of the Pothuau, Chanzy, and Latouche Tréville. The Pothuau passes to the Reserve Squadron. The Northern Squadron now consists of three first-class battleships and three second-class or coast-defence ships. The cruiser division of this squadron comprises three of the Condé class. The Dupleix, Jurien de la Gravière and Troude, which belong to the Atlantic Squadron, are included in the table with the Northern Squadron. The reorganisation of the French *défenses mobiles* has already been described in the chapter dealing with the progress of foreign navies. Eight torpedo gunboats of the Bombe and Léger classes, three old armoured gunboats, and the old coast-defence ship Tempête, besides destroyers, torpedo-boats, and submarine boats, are in commission at the various ports on the French coast in Algiers and Tunis, in connection with the *défenses mobiles*.

Germany. Last year Germany had in commission eight first-class battleships. This year the Active Battle Fleet comprises twelve battleships, divided into two squadrons of six ships each. The cruiser divisions attached to this fleet include two armoured cruisers, and six third-class cruisers of the Amazone class. Two torpedo-boat divisions are kept in commission. The Reserve Squadron comprises the eight coast-defence ships of the Siegfried class, which have recently been reconstructed.

Russia. The Russians, owing to the despatch of the Oslabya, and the four recently completed battleships Borodino, Alexander III, Orel, and Kniaz Souvaroff, forming Admiral Rozhdestvensky's squadron, to the East, have no first-class battleships available in the Baltic. They have available in the Black Sea two first-class battleships, the Tria Sviatitelia and the Kniaz Potemkine, and six second-class battleships, viz., the Rostislav, a fairly modern ship, and the Catherine II, Sinope, Tchesmé, Georgi Pobiedonosetz, and Dvenadzat Apostoloff, which are from thirteen to twenty years old.



RUSSIAN BATTLESHIP "KNIAZ POTEMKINE TAVRITCHESKY."



The Italians will have during the present year (1) in full commission for six months, and in partial commission for six months, four battleships, the Benedetto Brin, Regina Margherita, Emmanuele Filiberto, and St. Bon, three armoured cruisers, the Francesco Ferruccio, Garibaldi, and Varese, besides two torpedo gunboats, and ten torpedo-boat destroyers; (2) in reserve for ten months and in commission for two months, seven battleships (viz., three Sardegna class, three Andrea Doria class, and the Dandolo), the armoured cruiser Pisani, two third-class cruisers, and sixteen second-class torpedo-boats. Italy.

To sum up. In European waters we have in commission twenty-eight first-class battleships, the same number as last year. The French have in commission eleven first-class battleships (of which two are in Reserve in the Mediterranean) and four second-class battleships—of the latter one more than last year. The German Active Squadron has, on the other hand, been increased from eight to twelve battleships, all of the first class. The Russian Baltic Fleet is practically non-existent, owing to the despatch of almost every ship possessing a real fighting value to the East. Then it must not be forgotten that we have nine effective battleships in commission—in Reserve, it is true, but in a state of preparedness to reinforce our principal Fleets at a moment's notice. Summary.

In Eastern waters, while the China, East Indies, and Australian Stations will be retained as at present, the cruisers of the three stations will in time of war be placed under the command of the Commander-in-Chief of the China Station, who will be responsible for their distribution "so that they may at the earliest possible moment deal with all the ships of the enemy to be found in those waters."

The China Squadron consists of five battleships, viz., four Canopus class and the Centurion, as last year. The Cruiser Squadron attached to it consists of four first-class and four third-class cruisers. All the sloops and gunboats, of which in 1903 there were eleven and in 1904 eight, on this Station have been withdrawn. Two or three gunboats, in addition to the eight river gunboats, are necessary on this Station for service on the Chinese rivers. Eastern waters.

On the East Indies Station there are one second-class and three third-class cruisers; on the Australian Station, one first-class, one second-class, and five third-class cruisers and three sloops. Two of the third-class cruisers and one of the two torpedo gunboats which were provided under the Australian Naval Defence Act have been withdrawn, and are to be sold, while three other cruisers of the same class are in commission as drill ships. As pointed out in previous

numbers of the *Naval Annual*, these ships are too small for service on the south coast of Australia.

There are now only nine sloops and gunboats in commission in extra-European waters, as compared with twenty-three last year.

The French Far Eastern Squadron consists of the same three armoured cruisers* as last year, together with the Guichen and Chateaurenault, commerce destroyers, and three third-class cruisers, including the Infernet, which is on the East Indian Station.

The United States Asiatic Fleet consists of the battleships Wisconsin and Oregon, the coast-defence ship Monadnock, the cruisers Baltimore, Cincinatti and Raleigh, five gunboats, and five destroyers.

Other Stations.

On the Cape of Good Hope Station the Squadron has been reduced to one second-class and three third-class cruisers. The South Atlantic and Pacific Squadrons disappear. It would appear desirable to keep at any rate one cruiser of the first or second class to show the Flag on the West Coast of America.

The comparative tables.

In the chapter dealing with the Progress of Navies, the wholesale elimination of the older battleships and cruisers from the list of the British Navy has already been described. Several second-class battleships were struck out of the comparative tables last year, but now more follow suit, while only four British third-class battleships remain. For this reason, and in view of the fact that in the King Edward VII and Connecticut class, as well as in the new ships building for both the Russians and Japanese, a more powerful class of ship is coming into existence, it will shortly be necessary to attempt a re-classification. There is something to be said for that adopted in Appendix III of the Report of the Committee on the French Navy Estimates, where all battleships and cruisers are divided into two main divisions: (1) Ships having an indisputable military value and immediately available; (2) ships deficient in speed and protection or armament, and not immediately available for use in war against modern ships. For the present year it has been decided to adhere to the old classification.

Battleships. First class.

The principal changes in the list of first-class battleships are the completion of the Swiftsure and Triumph and three of the King Edward class (the Dominion being reckoned as completed) for the British Navy, the loss of six ships by the Russians, to which will probably have to be added the Cesarevitch, and not improbably the five ships of Admiral Rozhdestvensky's squadron if it ventures into Eastern waters, and the loss of two ships by the Japanese. The increase in the German Battle Fleet is two ships, as usual, while the

* The Sully is probably a total loss.

large expenditure on new construction in the United States will not begin to tell till next year. The present position is as follows :—

	Great Britain.	Germany.	United States.	France.	Russia.	Italy.	Japan.
Battleships 1st Class—Built ..	43	16	12	11	8	4	4
,, ,, Building	7	6	13	6	5	4	2
Total	50	22	25	17	13	8	6
To be laid down 1905-6	1	2	2	–	3	1	1

As regards completed first-class battleships, which, after all, constitute the chief element of naval strength, the British Navy stands in a better position than last year, or than it has ever done. Judged by this standard, Germany has become the second naval Power, the United States the third, while France drops into the fourth place.

Second class.

Turning to second-class battleships, the Sans Pareil and Collingwood have been placed in the non-effective list, though their armament has not yet been surrendered. The whole of the Admiral class have been put out of commission. Considerable sums were set down in the Navy Estimates last year for the repair and refit of vessels of the Admiral class, and though it is probably inadvisable to spend further sums for this purpose, it is to be hoped that they will not be sold out of the Navy. In the Naval Manœuvres of 1903 the Admirals showed themselves better able to maintain speed and seaway than the high free-board ships of the Royal Sovereign class. Their great weakness is the want of adequate protection for the base of the barbettes and for the secondary armament. The first defect it would be impossible to remedy without practically reconstructing the ship; the second could be remedied by the removal, as has been previously suggested in the *Naval Annual*, of some of the 6-in. guns, and placing the remainder in casemates. This change could be effected if war became imminent. The Admirals would then be well qualified to fight a considerable number of the second-class battleships included in the list of the French and Russian Navies. Eight of the ten French second-class battleships have recently been refitted, and are considered effective in the second line. The Henri IV is a new ship. The Neptune's boilers are defective. In the Italian list are included the Italia and Lepanto, which can hardly be considered effective battleships. If the Admirals were struck out, we should be left with only five second-class battleships, as compared with ten French and ten Russian ships.

Third class.

From the list of third-class ships the Conqueror and Hero and the French Fulminant have been struck out. We are left with only four ships, two Devastations and two Edinburghs, as against nine French and thirteen Russian ships in this class.

Cruisers. First class.

To turn to the cruiser classes. The drastic removals from the British list make a serious reduction in our cruiser strength in regard to numbers, as compared with last year. In the first-class cruisers, including with these the protected cruisers Powerful, Terrible and the eight Diadems, we have thirty ships completed, as compared with nine for France, two for Russia, four for Germany, and five for the United States.

Second class.

In the second-class the Impérieuse and Warspite and the three ships of the Orlando class have been struck out of the list, while four—the Aurora, Immortalité, Narcissus and Undaunted—though removed from the effective list in the returns, have not yet been placed on the sale list. These ships are certainly more powerful than the French Bruix class, as well as other cruisers included. The Dmitri Donskoi, for instance, ought to be struck out if she were not in commission with the Baltic Fleet. The Russians have lost the Rurik, Varyag, and Pallada, the Japanese the Takasago and Yoshino. No power, with the exception of Russia, is now building second-class cruisers.

In the third class the four Merseys, the Magicienne, Marathon, and Melpomene, eight ships of the Pearl class, with which are included the Australian cruisers Katoomba, etc., have been struck out of the British list. The French Sfax, the Russian Novik and Boyarin (lost during the war), the German Greif and Hela, which are only despatch vessels, have been struck out of the foreign lists. The ten Naval Defence Act cruisers, the Medea and Medusa, the Philomel, and the Pactolus and Pomone, two small third-class cruisers completed about five years ago, have been struck off the effective list, though their armaments are retained. If all these were removed we should be left with only thirty-two third-class cruisers completed, to twenty-six for France and eighteen for Germany—a very unfair comparison to this country. The Naval Defence Act cruisers have a good speed and fair armament for their size. They are certainly able to fight with a reasonable prospect of success any of the cruisers included in the foreign lists. As long as foreign Powers maintain in commission a large number of such ships, it will be inadvisable to sell the vessels alluded to out of the British Navy. For the protection of commerce in time of war numbers are above all things desirable.

Future position.

In the following table is given the estimated strength in first-class battleships when all the ships now on the stocks are completed:—

	England.	Germany.	United States.	France.	Russia.	Italy.	Japan.
1906 (end)	46	20	19	13	9	6	4
1907 (end)	48	22	22	17	9	8	6
1908 (end)	50	24	25	17	13	8	6

H.M.S. "CHALLENGER."

By the end of 1908, in first-class battleships, we shall still be just superior to a combination of any two other Powers, and considerably superior to a combination of any two European Powers, but our superiority will not be so marked as at the present time. The most important fact as regards the future is that the United States will complete between now and the end of 1906 no less than seven battleships, and in the two following years she will complete three battleships per annum, whereas we shall complete two.

Programmes.

It is only proposed to lay down one battleship for the British Navy during the current year. In the French Navy none were proposed in the Estimates, but in consequence of the discussions that have taken place in the French Chamber it is probable that a new programme of battleship construction will be undertaken, designed to keep the strength of the French Navy at least on a level with that of the German Navy. The Germans will lay down two battleships, as usual, and there is an agitation for a further addition to the programme of new construction. In view of the disasters that have overtaken Russia in the war with Japan, nothing can be said with certainty as to the ambitious programme of new construction which was foreshadowed a few months ago. In the United States considerable reaction has taken place against the rapid expansion of the Navy. The Estimates proposed by the Navy Department have been cut down by Congress, and instead of the three battleships proposed —a proposal strongly supported by the President—only two are to be laid down. In view of the above considerations as to what is being done by foreign Powers, and of the fact that the Russian Navy has been so seriously crippled, some limitation was permissible in British new construction for the current year. But it would be rash to expect that this reduction can be permanent.

The command of the sea.

The command of the sea is absolutely vital to the people of the United Kingdom, who depend on over-sea supplies for the raw materials of their industries and the very food on which they live. It is equally vital to the continuance of the British Empire. It must be preserved against all competitors. A few months ago it appeared that the policy of both Germany and the United States, under the impulse of their vigorous rulers, was to compete with us sooner or later for the command of the sea. The resources of the United Kingdom are equal to building against Germany; it was doubtful whether they would be equal to building against Germany and Russia, a combination which then seemed more than probable, and the possibility of which has not passed away. The resources of the United Kingdom are, however, not equal to those of the United States, and if the people of the United States should ever determine

to secure the command of the sea, the people of the United Kingdom, unaided by her Colonies and without allies, cannot prevent it. But the resources of the British Empire are far more than equal to those of the United States, and if the colonial taxpayer proves willing—in the not far distant future—to share the burden which is becoming too heavy for the taxpayers of the motherland, the danger of the loss of the command of the sea will be gone. From this point of view the federation of the Empire is becoming a necessity.

Japanese alliance.

The alliance with Japan has been mutually advantageous, and has more than justified the wisdom and the foresight of the statesmen by whom it was brought about. The Japanese, by preventing the gradual absorption of China by Russia, have struck a great blow on behalf of British interests in the Far East; but they could not have entered on war with Russia without the alliance with Great Britain and the power of the British Navy to preserve for them a clear field during the war and to prevent them being robbed of the fruits of victory, as they were on a previous occasion, at its close.

The Navy of our Japanese allies has been reduced to four battleships. Only two battleships are under construction, though more are said to be in contemplation. The Japanese Navy is therefore too weak in this all-important element of naval strength to count for much in a contest with a strong naval Power at the present moment. None the less, it is in the interest of both countries that the Anglo-Japanese alliance should be renewed.

Relations with United States.

The above words are written in no spirit of hostility to the United States. But facts must be faced. At the end of 1908 the United States will become the second naval Power of the world, and the British and United States Navies combined would be able to put into line seventy-five first-class battleships, as compared with sixty-nine possessed by the five other naval Powers. An alliance between Great Britain and the United States would enable the two great branches of the English-speaking race to ensure the peace of the world, and, moreover, permit the respective Governments to considerably diminish the burdens now imposed on their taxpayers in the race for naval supremacy. To bring about such an alliance should be the aim of statesmen on both sides of the Atlantic, but it must be entered into by the British people, not as supplicants, but on equal terms.

Comparative Tables of British, German, United States, French, Russian, Italian, and Japanese Ships.

TABLE I.—FIRST-CLASS BATTLESHIPS.

GREAT BRITAIN.

Launched.	Name.	Displacement.
		tons.
1891	Empress of India	
1891	Hood	
1892	Ramillies	
1892	Repulse	14,150
1892	Resolution ...	
1892	Revenge	
1892	Royal Oak ...	
1891	Royal Sovereign	
1895	Renown	12,350
1894	Magnificent ...	
1895	Majestic	
1895	Prince George ...	
1895	Victorious ...	
1896	Cæsar	14,900
1896	Hannibal	
1896	Illustrious ...	
1895	Jupiter	
1896	Mars	
1897	Canopus	
1899	Glory	
1898	Albion	12,950
1898	Goliath	
1898	Ocean	
1899	Vengeance ...	
1898	Formidable ...	
1898	Irresistible ...	
1899	Implacable ...	15,000
1899	London	
1899	Venerable ...	
1899	Bulwark	
1901	Albemarle ...	
1901	Cornwallis ...	
1901	Duncan	
1901	Exmouth	14,000
1901	Russell	
1901	Montagu	
1902	Queen	15,000
1902	Prince of Wales	
1903	Swiftsure	11,880
1903	Triumph	
1903	Edward VII. ...	
1903	Commonwealth	
1903	Dominion ...	
1903	*Hindustan* ...	
1904	*New Zealand* ...	16,350
	Africa	
1904	*Britannia* ...	
	Hibernia	
	Lord Nelson ...	16,500
	Agamemnon ...	
	50 ships.*	727,910

GERMANY.

Launched.	Name.	Displacement.
		tons.
1891	Brandenburg ...	
1891	Kurfürst Friedrich Wilhelm	9,874
1891	Weissenburg ...	
1892	Wörth	
1896	Kaiser Friedrich III. ...	
1897	Kaiser Wilhelm II.	
1899	Kaiser Wilhelm der Grosse ...	10,974
1900	Kaiser Barbarossa	
1899	Kaiser Karl der Grosse	
1900	Wittelsbach ...	
1901	Wettin	
1901	Zähringen ...	11,643
1901	Mecklenburg ...	
1901	Schwaben	
1902	Braunschweig ...	
1903	Elsass	
1903	*Hessen*	12,997
1903	*Preussen*	
1904	*Lothringen* ...	
1904	*Deutschland* ...	
	O	
	P	12,997
	22 ships.‖	256,557

UNITED STATES.

Launched.	Name.	Displacement.
		tons.
1893	Indiana	
1893	Massachusetts ...	10,288
1893	Oregon	
1896	Iowa	11,340
1898	Kearsarge	11,540
1898	Kentucky	
1898	Alabama	11,565
1898	Illinois	
1898	Wisconsin ...	11,653
1901	Maine	12,300
1901	Missouri	
1901	Ohio	12,440
1904	*Georgia*	
1904	*Nebraska* ...	
1904	*New Jersey* ...	14,948
1904	*Rhode Island* ...	
1904	*Virginia*	
1904	*Connecticut* ...	
	Kansas	
1904	*Louisiana* ...	
	Minnesota ...	16,000
	New Hampshire	
	Vermont	
	Idaho	13,000
	Mississippi ...	
	25 ships.**	333,847

FRANCE.

Launched.	Name.	Displacement.
		tons.
1891	Brennus	11,190
1894	Carnot	11,954
1893	Charles Martel	11,693
1893	Jauréguiberry ...	11,637
1895	Masséna	11,735
1896	Bouvet	12,007
1895	Charlemagne ...	11,108
1896	Gaulois	11,105
1896	St. Louis	11,090
1898	Iéna	11,861
1899	Suffren	12,527
1903	*Patrie*	
1902	*République* ...	
	Liberté	14,635
	Justice	
	Vérité	
	Démocratie ...	
	17 ships.	215,717

RUSSIA.

Launched.	Name.	Displacement.
		tons.
1892	Tria Sviatitelia	13,318
1900	Kniaz Potemkine	12,480
1898	Oslabya	12,674
1901	Cesarevitch† ...	12,912
1901	Borodino	
1901	Alexander III.	
1901	Orel	13,516
1902	Kniaz Souvaroff	
1903	*Slava*	
	Imperator Pavel I.	
	Andrei Pervozvannui ...	16,630
	Ioann Zlatoust	12,733
	Evstafi	
	13 ships.	177,690

ITALY.

Launched.	Name.	Displacement.
		tons.
1897	E. Filiberto ...	9,645
1897	Saint Bon	
1901	Rª Margherita	13,214
1901	Benedetto Brin	
1904	*Rª Elena*	
1904	*Emanuele III.* ..	12,425
	Roma	
	Napoli	
	8 ships.	95,418

JAPAN.

Launched.	Name.	Displacement.
		tons.
1896	Fuji	12,320
1896	Asahi	12,300
1899	Shikishima ...	15,200
1898	Mikasa	14,850
1900	*Kashima*	15,200
	Katori	16,400
		15,950
	6 ships.‡	89,920

* 1 projected. † Interned at Kiao Chau. ‖ 2, *Q* and *R*, projected. ** 2 projected. ‡ Yashima has been lost. One ship reported laid down in Japan.

Table II.—Second-Class Battleships.

GREAT BRITAIN.

Launched.	Name.	Displacement.
		tons.
1888	Nile	11,940
1887	Trafalgar ...	
1893	Barfleur	10,500
1892	Centurion	
1886	Anson ...	10,600
1885	Benbow	10,600
1885	Camperdown ...	10 600
1885	Howe	10,300
1884	Rodney	10,300
	B.	
1882	Collingwood* ...	9,500
1887	Sans Pareil* ...	10,740
	11 ships.	117,520

FRANCE.

Launched.	Name.	Displacement.
		tons.
1883	Baudin	10,884
1879	Duperré	11,032
188[illegible]	Courbet	10,195
1879	Dévastation ...	10,095
1885	Formidable ...	10,878
1886	Hoche	10,581
1890	Magenta	10,680
1887	Marceau	10,558
1887	Neptune†	10,810
1899	Henri IV. ...	8,807
	10 ships.	104,521

RUSSIA.

Launched.	Name.	Displacement.
		tons.
1892	Georgi Pobiedonosetz	10,280
1891	Navarin	10,206
1886	Catherine II. ...	10,180
1887	Sinope	10,180
1886	Tchesmé	10,930
1894	Sissoi Veliky ...	10,400
1896	Rostislav	8,880
1889	Nicolai I.	9,672
1887	Alexander II. ...	9,244
1890	Dvenadzat Apostoloff ...	8,423
	10 ships.	98,405

ITALY.

Launched.	Name.	Displacement.
		tons.
1880	Italia‡	15,407
1883	Lepanto‡	15,549
1885	Andrea Doria ...	11,027
1884	R. di Lauria ...	10,997
1885	F. Morosini ...	11,145
1888	Re Umberto ...	13,673
1890	Sardegna	13,640
1891	Sicilia	13,087
	8 ships.	104,525

* Armaments not removed. † Boilers defective. ‡ Unfit to "lie in a line."

Table III.—Third-Class Battleships and Coast Defence Ships.

GREAT BRITAIN.

Launched.	Name.	Displacement.
		tons.
1871	Devastation ...	9,330
1872	Thunderer ...	
1882	Colossus	9,420
1882	Edinburgh ...	
	4 ships.*	37,500

GERMANY.

Launched.	Name.	Displacement.
		tons.
1880	Baden	7,252
1878	Bayern	
1877	Sachsen	
1878	Württemberg ...	
1884	Oldenburg ...	5,140
1889	Ægir	4,084
1890	Odin	
1895	Siegfried	4,049
1894	Beowulf	
1891	Frithjof	
1893	Hagen	
1892	Heimdall	
1892	Hildebrand ...	
	13 ships.	66,6[illegible]0

UNITED STATES.

Launched.	Name.	Displacement.
		tons.
1892	Texas	6,315
1883	Amphitrite ...	3,990
1876	Miantonomoh ...	
1883	Monadnock ...	
1883	Terror	
1891	Monterey	4,084
1884	Puritan	6,060
1900	Arkansas	3,235
1900	Nevada	3,714
1901	Florida	3,23[illegible]
1900	Wyoming ...	3,2[illegible]
	11 ships.	45,821

FRANCE.

Launched.	Name.	Displacement.
		tons.
1892	Bouvines	6,691
1893	Tréhouart ...	6,671
1892	Jemmapes ...	6,474
1892	Valmy	
1885	Caïman	7,050
1883	Indomptable ...	7,105
1885	Requin	7,078
1881	Terrible	7,206
1883	Furieux	5,925
	9 ships.	60,674

RUSSIA.

Launched.	Name.	Displacement.
		tons.
1894	Adm. Senjavin	4,792
1893	Adm. Oushakoff	4,648
1896	Gen. Adm. Apraxine ...	4,126
	3 ships.	13,566

ITALY.

Launched.	Name.	Displacement.
		tons.
1878 1876	Dandolo	12,071
	1 ship.	12,071

JAPAN.

Launched.	Name.	Displacement.
		tons.
1882	Chin Yen	7,400
	1 ship.	7,400

* Conqueror and Hero struck out.

TABLE IV.—FIRST-CLASS CRUISERS.

GREAT BRITAIN. Speed.	Name.	Displacement.	GERMANY. Speed.	Name.	Displacement.	UNITED STATES. Speed.	Name.	Displacement.	FRANCE. Speed.	Name.	Displacement.	RUSSIA. Speed.	Name.	Displacement.	ITALY. Speed.	Name.	Displacement.	JAPAN. Speed.	Name.	Displacement.
kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.	kts.		tons.
22	Powerful	14,200	19	Fürst Bismarck	10,570	21·9	Brooklyn	9,215	21	Jeanne d'Arc ...	11,092	20	Rossia	12,130	20	Giuseppe Garibaldi	7,294	21½	Asama	9,700
22	Terrible		20½	Prinz Heinrich	8,759	21	New York ...	8,200	21	Gueydon		20	Gromoboi	12,336	20	Varese		21½	Tokiwa	
20½	Andromeda ...		20½	Prinz Adalbert	8,858	22	West Virginia		21	Montcalm ...	9,367				20	F. Ferruccio ...		21	Adzuma	9,436
20½	Diadem		20½	Friedrich Karl...		22	*California* ...		21	*Dupetit Thouars*						*A*	9,842	20	Yakumo	9,850
20½	Europa	11,000	21	*Roon*	9,350	22	Colorado	13,680	21	Condé								21	Idzumo	9,750
20½	Niobe		21	*Yorck*		22	*Maryland* ...		21	Sully‡								21	Iwate	
20¾	Amphitrite ...		22½	*C*	11,319	22	Pennsylvania ...		21	Gloire	9,856							20	Kasuga	7,700
20¾	Argonaut					22	*South Dakota*...		21	Marseillaise ...								20	Nisshin	
20¾	Ariadne	11,000				22	*St. Louis*		21	Amiral Aube ...										
20¾	Spartiate					22	*Charleston* ..	9,700	21	Léon Gambetta										
21	Aboukir					22	*Milwaukee* ...		21	*Jules Ferry* ...	12,351									
21	Bacchante ...					22	*Washington* ...		21	*Victor Hugo* ...										
21	Cressy					22	*Tennessee*... ...		21	*Jules Michelet*..	12,370									
21	Euryalus	12,000					*Montana*	14,500	23	*Ernest Renan*...										
21	Hogue						*North Carolina*		23	*Edgar Quinet* ‖	13,427									
21	Sutlej								23	*Waldeck Rousseau* ‖ ...										
23	Drake																			
23	Good Hope ...																			
23	King Alfred ...	14,100																		
23	Leviathan ...																			
23	Monmouth ...																			
23	Kent																			
23	Bedford																			
23	Essex																			
23	Berwick																			
23	Cornwall	9,800																		
23	Cumberland ...																			
23	Donegal																			
23	Lancaster ...																			
23	Suffolk																			
22¼	*Devonshire* ...																			
22¼	*Antrim*																			
22¼	*Argyll*																			
22¼	*Carnarvon* ...	10,700																		
22¼	*Hampshire* ...																			
22¼	*Roxburgh* ...																			
22½	*Duke of Edinburgh*																			
22½	*Black Prince* ..																			
22½	*Achilles*																			
22½	*Cochrane*	13,500																		
22½	*Natal*																			
22½	*Warrior*																			
22½	*Minotaur*... ...																			
22½	*Shannon*	14,600																		
22½	*Defence*																			
	45 ships.*	531,000		7 ships.†	67,064		15 ships.	186,595		16 ships.	178,139		2 ships.	24,466		4 ships.¶	31,724		8 ships	73,586

* 4 projected. † D projected. ‡ Wrecked; probably a total loss. ‖ Tonnage uncertain. ¶ 1 projected.

TABLE V.—SECOND-CLASS CRUISERS.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
21¼	Blake	9,000 (Blake, Blenheim)
21¼	Blenheim	
19¾	Crescent	7,700
20	Edgar	7,350
20	Endymion ...	7,350
19¾	Gibraltar	7,700
20	Grafton	7,350
20	Hawke	7,350
19¾	Royal Arthur ...	7,700
19¾	St. George ...	7,700
20	Theseus	7,350
19½	Diana	5,600 (Diana to Venus)
19½	Dido	
19½	Doris...	
19½	Eclipse	
19½	Isis	
19½	Juno	
19½	Minerva	
19½	Talbot	
19½	Venus	
19	Arrogant ...	5,750 (Arrogant to Vindictive)
19	Furious	
19	Gladiator	
19	Vindictive ...	
20	Hermes	5,600 (Hermes to Hyacinth)
20	Highflyer... ...	
20	Hyacinth	
21	Challenger ...	5,880 (Challenger, Encounter)
21	*Encounter* ...	
	B.	
	Aurora	5,600 (Aurora to Undaunted)
	Immortalité ...	
	Narcissus... ...	
	Undaunted ...	
	33 ships.*	209,910

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
21	Kaiserin Augusta	5,956
21	Freya	5,569 (Freya to Victoria Luise)
21	Hertha	
21	Victoria Luise	
21	Hansa	5,791 (Hansa, Vineta)
21	Vineta	
	6 ships.	34,245

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
22·8	Columbia	7,375 (Columbia, Minneapolis)
23	Minneapolis ...	
21½	Olympia	5,870
	3 ships.	20,620

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
20	Dupuy de Lôme	6,676
19	D'Entrecasteaux	7,995
23	Guichen	8,151
23	Châteaurenault	7,898
18	Bruix	4,735
18	Chanzy	4,736
18	Charner	4,702
18	Latouche-Tréville	4,681
19	Pothuau	5,374
19	Cecille	5,839
19	Tage	7,469
23	Jurien de la Gravière ...	5,595
21	Desaix	7,578 (Desaix to Kléber)
21	Dupleix	
21	Kléber	
	15 ships.	96,585

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
16¾	Adm. Nahimoff	8,524
18	Pamyat Azova	6,734
16	Dmitri Donskoi	6,200
15	Vladimir... ...	5,593 (Vladimir, Monomach)
	Monomach ...	
20	Aurora	6,731
20	Diana†	6,630
23	Askold‡	5,905
23	Bogatyr‖	6,645 (Bogatyr to Otchakoff)
23	*Kagul*	
23	*Otchakoff*	
23	Oleg	6,675
	11 ships.	77,520

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
20	Carlo Alberto ...	6,396 (Carlo Alberto, Vettor Pisani)
20	Vettor Pisani ...	
19	Marco Polo ...	4,511
	3 ships.	17,303

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
22	Chitose	4,760
22	Kasagi	5,416
	2 ships.	10,176

* Armaments of ships under B not yet surrendered.

† Interned at Saigon.

‡ Interned at Shanghai.

‖ Wrecked at Vladivostock.

TABLE VI.—THIRD-CLASS CRUISERS.

GREAT BRITAIN.

Speed.	Name.	Displacement.
kts.		tons.
19½	Astræa	
19½	Bonaventure ...	
19½	Cambrian... ...	
19½	Charybdis ...	
19½	Flora...	4,360
19½	Forte...	
19½	Fox	
19½	Hermione... ...	
19¾	Æolus	
19¾	Brilliant	
19¾	Indefatigable ...	3,600
19¾	Iphigenia	
20	Latona	
20	Sappho	3,400
20	Scylla	
19¾	Sirius	3,600
20	Terpsichore ...	3,400
20	Thetis	3,400
20½	Pelorus	
20	Proserpine ...	
20	Pegasus	
20	Perseus	2,135
20	Prometheus ...	
20	Pyramus	
20	Pandora	
20	Pioneer	2,200
20	Psyche	
23	Amethyst... ...	
22	Diamond	3,000
22	Sapphire	
22	Topaze	

GERMANY.

Speed.	Name.	Displacement.
kts.		tons.
20	Gefion	3,712
20	Irene...	4,233
19	Prinzess Wilhelm ...	
21	Gazelle	2,603
21	Niobe	
21	Medusa	
21	Nymphe	
21	Amazone	2,618
21	Ariadne	
21½	Thetis	
21½	Frauenlob ...	
22	Arcona	2,657
22	Undine	
23	Bremen	
23	Hamburg ...	
23	Berlin	
23	Munchen	
23	Lubeck	3,200
23	*Leipzig* (*N*) ...	
23	*Ersatz Alexandrine*	
23	*Ersatz Meteor*...	

UNITED STATES.

Speed.	Name.	Displacement.
kts.		tons.
18½	Detroit	
18½	Marblehead ...	2,089
18½	Montgomery ...	
20	Albany	3,487
20	New Orleans ...	
20	Baltimore... ...	4,413
18	Chicago	5,273
19	Newark	4,098
19½	San Francisco...	
19½	Philadelphia ...	4,324
19	Cincinnati ...	3,213
19	Raleigh	
24	*Birmingham* ...	
24	*Chester*	3,750
24	*Salem*	
16½	Cleveland... ...	
16½	*Denver*	
16½	Des Moines ...	3,200
16½	*Chattanooga* ...	
16½	*Galveston* ...	
16½	*Tacoma*	

FRANCE.

Speed.	Name.	Displacement.
kts.		tons.
20	Davout	3,031
20	Linois	2,308
20	Galilée	2,318
20	Lavoisier	2,285
20½	D'Estrees... ...	2,421
20½	Infernet	2,435
19½	Alger	4,313
19	Isly	4,406
19	Jean Bart... ...	4,044
19¼	Bugeaud	3,809
19¼	Chasseloup-Laubat	3,824
19¼	Friant	3,882
19¼	Pascal	3,951
19	Descartes	3,970
20	Suchet	3,362
19	Cassard	3,890
19	D'Assas	3,962
19	Du Chayla ...	3,890
19	Catinat	4,048
19	Protet	4,001
19½	Coëtlogon	1,901
20½	Cosmao	1,923
20½	Forbin	1,935
20½	Lalande	1,968
20½	Surcouf	2,012
20½	Troude	1,994

RUSSIA.

Speed.	Name.	Displacement.
kts.		tons.
17½	Adm. Korniloff	5,800
20	Svietlana	3,862
19	Almaz	3,285
23	Jemtchug ...	3,106
23	Izumrud	

ITALY.

Speed.	Name.	Displacement.
kts.		tons.
20	Vesuvio	3 373
18	Etna	3,470
17¼	Fieramosca ...	3,534
19	Stromboli... ...	3,836
21	Piemonte	2,597
19	Calabria	2,428
19½	Dogali	2,055
18	Elba	2,690
17½	Giovanni Bausan	3,277
19	Etruria	
18	Liguria	2,245
18	Umbria	
21	Lombardia ...	2,351
20	Puglia	2,498

JAPAN.

Speed.	Name.	Displacement.
kts.		tons.
20	Akashi	2,657
20	Suma	
19	Akitsushima ...	3,150
18	Idzumi	2,800
19	Chiyoda	2,450
17	Hashidate ...	
17	Itsukushima ...	4,277
17	Matsushima ...	
18½	Naniwa	3,700
18½	Takachiho ...	
20	Niitaka	3,420
20	Tsushima... ...	
20	Otawa	3,000

TABLE VI.—THIRD-CLASS CRUISERS (*continued*).

GREAT BRITAIN.			GERMANY.			UNITED STATES.			FRANCE.			RUSSIA.			ITALY.			JAPAN.		
Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.	Speed.	Name.	Displacement.
kts.		tons.																		
25	*Adventure* ...	2,940																		
25	*Attentive*																			
25	*Foresight*... ...	2,945																		
25	*Forward*																			
25	*Pathfinder* ...	3,000																		
25	*Patrol*																			
25	*Sentinel*	2,940																		
25	*Skirmisher* ...																			
	B*																			
20	Andromache ...	3,400																		
20	Apollo	3,400																		
19¾	Intrepid	3,600																		
20	Melampus ...	3,400																		
20	Naiad	3,400																		
19¾	Pique	3,600																		
19¾	Rainbow																			
19¾	Retribution ...																			
19¾	Spartan																			
20	Tribune	3,400																		
20	Medea	2,800																		
20	Medusa	2,800																		
19	Philomel	2,575																		
20	Pactolus	2,135																		
20	Pomone	2,135																		
	54 ships.	171,185		21 ships.‖	64,045		21 ships.	72,323		26 ships.	81,883		5 ships.	19,150		14 ships	38,844		13 ships.	43,785

* The armaments of ships under B not yet surrendered. ‖ 3 projected.

Effective Fighting Ships, Built and Building.

Class.	Great Britain.			Germany.			United States.			France.			Russia.			Italy.			Japan.		
	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.	Built.	Building.	Total.
Battleships:—																					
1st Class ...	43	7	50	16	6	22	12	13	25	11	6	17	8	5	13	4	4	8	4	2	6
2nd Class ...	11	—	11	—	—	—	—	—	—	10	—	10	10	—	10	8	—	8	—	—	—
3rd Class ...	4	—	4	13	—	13	11	—	11	9	—	9	3	—	3	1	—	1	1	—	1
Total ...	58	7	65	29	6	35	23	13	36	30	6	36	21	5	26	13	4	17	5	2	7
Cruisers:—																					
1st Class ...	30	15	45	4	3	7	5	10	15	9	7	16	2	—	2	3	1	4	8	—	8
2nd Class ...	32	1	33	6	—	6	3	—	3	15	—	15	9	2	11	3	—	3	2	—	2
3rd Class ...	46*	8	54	18	3	21	14	7	21	26	—	26	5	—	5	14	—	14	13	—	13
Total ...	108*	24	132	28	6	34	22	17	39	50	7	57	16	2	18	20	1	21	23	—	23

* These figures include 19 vessels "struck off the l of Effective Ships of War" in Parliamentary Return, but which should be still capable of useful service.

CHAPTER IV.

THE NAVY AND THE SOMALILAND EXPEDITION, 1902-4.

THE ships of the East Indian Squadron, assisted at times by cruisers lent from the Mediterranean Fleet, took a continuous, though not always a showy, part in the recent Somaliland Campaign. The duties of the Navy were constant and unrelaxing, and involved those functions which always fall to the Service afloat, such as "patrolling the coast," "embarking and disembarking troops and stores," and which, though at times unseen, and unadvertised, are yet no less important than the military operations proceeding concurrently.

Somaliland and its resources.

Somaliland, with its great length of coast line on the Gulf of Aden and on the Indian Ocean, depends a great deal for its supplies on the oversea trade; while arms and munitions of war have all to come from Europe originally, and are therefore obliged to cross the sea somewhere near the Somali coast. It is almost entirely pastoral country; the various tribes owe allegiance to their sheikh or sultan, and travel over the country with their flocks and herds in search of the suitable spots for pasturage, and the people depend even for their food on outside assistance. Under these circumstances, it might have been imagined that a patrol of the coast, for a short time, would have quickly brought the Mullah to his knees, and ended all attempts at insurrection; but on examination the following complications are apparent.

Introduction of arms.

The coast is not entirely British. To the westward is the French Protectorate (including Jibutil), while to the eastward is the Italian Protectorate; and it was evidently impossible that the natives of these States could—because there was trouble in the British territory—be deprived of food and the necessaries of life, which therefore came to the Mullah in abundance over the land frontier. Arms and munitions of war were introduced in various ways. There is no doubt that a great number actually passed through Aden itself; while others came through Jibutil, and some through Italian territory. At times dhows with arms were discovered, but there were many occasions on which they were out of British territorial waters, and were not deemed worthy of the delay and trouble of an International search.

With Berbera as a base, and Aden as a coaling station, the ships remained constantly on the coast, visiting the various ports of call in English and Italian territory, examining the places suitable for landing of troops, collecting intelligence, examining dhows, and assisting to protect the coast tribes from interference by the Mullah. The work, on the east coast especially, was exceedingly arduous, and the coal supply of the smaller ships being only just sufficient to get to and from Obbia, it was necessary for them to remain at anchor in the swell of the N.E. monsoon on a dead lee shore, without fires alight, for days or even weeks together. Duties of Navy.

At Durbo, in December, 1903, a gallant little effort on the part of Captain E. F. A. Gaunt, of the Mohawk, to avenge the death of an Italian naval officer, resulted in a little affair on the beach in which the landing party of the Mohawk were attacked by the natives, but defeated them with a loss of several lives, but not before Captain Gaunt himself had been badly wounded. Affair at Durbo.

The Navy, in addition to the work already mentioned, were responsible for :—

1. The Landing at Obbia.
2. The Capture of Illig.

These will be more fully described.

Landing of General Manning and His Column at Obbia.

In the winter of 1902 it was decided to land a force on the east coast in Italian territory, to march inland to meet the column from the north. Two places were considered for this disembarkation, viz., Obbia and Illig; and the former was chosen, as having a small beach, which was partly sheltered by a ridge of rocks from the wind and swell of the N.E. monsoon. The latter, which had not then been fortified by the Mullah, though having a larger beach, was rejected, as being too much exposed to the prevailing wind. The passage to the beach at Obbia was narrow, and was between rocks, on which the seas never ceased to break with varying violence, according to the strength of the wind, which at that time of year was between N.N.E. and N.E. It was necessary for the boats to pull in through the narrow entrance; and when inside, to go either to the beach, where they were unladen by men wading up to the neck in water, or else to proceed alongside the ledge of rock. The weather was never altogether favourable, as the N.E. monsoon had well set in before the troops arrived; and on some days disembarkation was impossible, because the surf and swirl of water was so great as to capsize and render Difficulties of landing.

unmanageable the boats in the narrow passage, while at the same time the rise and fall of water at the ledge of the rocks prevented any boat from unloading inside.

The boats employed.

Owing to the exceedingly small space available for disembarkation, both in the passage of the rocks and on the beach itself, it was impossible to use boats of any great size, and almost the whole of the work was carried out by the boats of the Naiad, Perseus, and Pomone of the East Indian Squadron, and the boats of the transports manned by the seamen of the men-of-war. Some surf boats from Madras (massula boats), manned by natives, assisted towards the latter end of the disembarkation, and proved eminently suitable for the work. They stood the knocking about better than the man-of-war boats, being made of solid wood sewn together, so that there was no special point of weakness, and being designed for no purpose but working in a surf. The wooden boats of the men-of-war and transports required constant repair, which was sometimes so extensive that the boat was laid up altogether, and it often took the carpenters of the Fleet most of the night to render the boat efficient for work in the morning. The steel boats of the transports stood the work well, and, though dreadfully battered and dented, were able to continue at work till the end of the disembarkation, and when landed at Bombay Yard for repairs were straightened out as good as new. Two troop barges, which came from Bombay, were used for the landing of stores, but were too big to go inside the entrance; consequently, when loaded, they were towed to moorings, laid down just outside the rocks, and were from there cleared by the surf boats.

General Manning landed at Obbia on January 5, and the disembarkation commenced shortly afterwards, and continued through January and the first half of February. Captain the Honourable A. Bethel, R.N., of the Naiad, was in charge of the landing arrangements, having under him the officers of the East Indian Squadron and of the Royal Indian Marine.

Landing of horses.

Horses and mules were swum ashore, this being found by experience to be the most satisfactory method, and to be, once practice had been attained, comparatively safe. The animals were hoisted out by the derricks of the steamer and placed in the water alongside, where a pulling boat awaited them, when each animal was secured to the boat by a rope which was so fitted that it could not slip over the head and also could not be pulled so tight as to cause choking. In fine weather four animals could be taken at a time by one boat, the position of the animals being one on each bow and one on each quarter; but under these conditions the boats were not very manage-

able, and an increasing swell quickly caused a reduction in the number that could be landed at a time. When three were taken it was found that the best method was one on each quarter and one on the lee bow; and finally, when, owing to the wind and sea, only one animal could go at a time, it was towed in from the lee quarter. With animals towing astern it was quite impossible for any boat to turn round and back in on to the beach. The method, therefore, was to pull as hard as possible through the entrance and straight up on to the beach inside, when men from the beach waded in, and the animals on finding their feet were led into camp.

Landing of camels.

The swimming method, though perfectly satisfactory and superior to all others for horses and mules, did not do so well for camels. The camel, not only from its size, but more from its ungainliness and clumsiness, is not easy to manage when towed in the water. A horse will swim and will make an intelligent effort both to steer and to keep its nose out of water; but a camel, being simply an ungainly mass of flesh, will make no effort to help the proceedings in any way. Two ropes were used, and another especially to keep its nose out of water, and in this way several camels were landed. It was found, however, that some were drowned, and all were greatly exhausted by the passage through the water. The camel, being by nature an animal that once exhausted will make no effort to regain its strength, frequently was landed perfectly sound, only to sit down and die on the beach at its leisure. To overcome this serious defect, it was necessary to find other methods to land the camels, and they were consequently placed inside the boats. It was found that the Somali camels could be stowed two at a time in the massula boats, being hoisted out by the derrick of the steamer, and placed fore and aft with their legs tied, and resting in the bottom of the boat. The boat pulled in through the entrance, and was turned up on its bilge on the beach, when the camels were hauled bodily out. This method was safe and fairly satisfactory, but it was not sufficiently rapid; while the Indian camels, being much bigger and heavier than the Somali, could not be carried in the massula boats. It was then decided to utilise the big steel boats of the transports for the purpose; and to make room for camels to stow athwartships the thwarts and air boxes were removed, leaving simply a steel shell. Under these conditions as many as ten or eleven camels could be landed in one trip. They were stowed athwartships with legs tied, and rested on a bed of sand in the bottom of the boat, which was towed to the entrance, and then pulled in by men sitting on the camels. On the arrival of the boat on the beach it was placed broadside on, and hauled bodily over till the animals could be hauled

out, when, their legs being untied, they found their feet and walked to camp. In this way in favourable weather as many as 365 camels were safely landed in one day.

The want of a full-powered tug was severely felt during the disembarkation; the steam cutters of the Naiad, Perseus, and Pomone, and of the Italian cruiser Caprera, did their utmost to cope with the heavy towage in the nasty swell of the N.E. monsoon, but they were working at the highest pressure, and in conditions of weather for which they were not suitable. Three of them were lost owing to swamping alongside the ships, or drifting on the rocky coast, on which the surf never ceased to break with varying violence, according to the weather conditions. A steam tug arrived from Aden towards the end of the operation, and did most useful work.

The seamen of the Squadron worked from 5.30 a.m. till dark, generally wet through, taking their meals when they could get them. They quickly got into the way of managing the animals under the strange conditions; and they proved again what has been proved a hundred times lately—that the British seaman remains, as of old, the "handy man" of the Empire.

Numbers landed.

The approximate number of troops, stores, and animals landed was:—

Officers and Men	4,500
Horses	850
Camels	1,300
Mules	800
Tons of stores	12,000

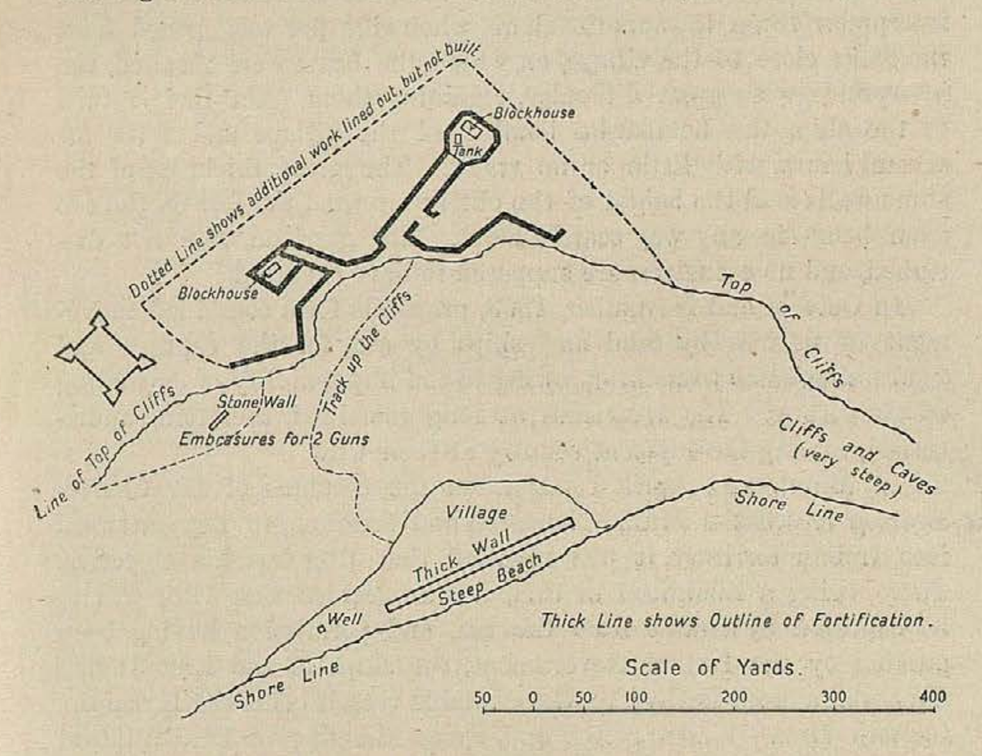
The loss of human life was nil, while the loss of animals (all drowned) was:—

Horses and Mules	16
Camels	10

By the middle of February the disembarkation was completed, and Obbia was given up as a base, the column moving inland, while the transports and ships returned to Berbera and India. The landing was well managed throughout; the loss of animals and damage to stores was reduced to an amount that was not believed to be possible when the coast was first examined. Two months earlier the coast was comparatively free from surf, but once the N.E. monsoon had well set in, there was no more smooth water; and it became a tussle between the seamen and the surf, in which the former proved victorious.

CAPTURE OF ILLIG.

Illig, situated on the east coast in Italian territory, some 150 miles to the northward of Obbia, has always been considered one of the principal ports of that inhospitable coast; for it possesses a sandy beach at the village, another called Middle Beach between the village and the Galluli River, and another at the mouth of that river which is some four miles to the northward of the village. Though there is comparatively little shelter from the N.E. monsoon, and nothing to break the swell of the S.W. monsoon, it can be used on



favourable days for the landing of men and stores, arms, and merchandise.

Illig was raided by the Mullah in August, 1903. He came with a considerable force, estimated at over 3000 men, and absolutely sacked the whole place. The inhabitants, mostly of the Mijertain tribe, were put to the sword (600 are said to have been killed), and a large number of rifles were captured, while great herds of goats and sheep were carried off. When the Mullah, with his force, moved off again inland, he took with him a large number of the Mijertains, and he left behind a permanent Dervish garrison of 200 riflemen, and a corresponding number of spearmen. This garrison, assisted by the inhabitants, built the elaborate fortifications, which were marked out

The Mullah's raid on Illig.

by the Mullah before he left the coast. The strength of the position showed clearly that he intended it as a place of refuge, if necessary, for himself and his force, and as a port of escape for himself should circumstances render it desirable for him to proceed by dhow to Arabia. He accumulated at Illig all his skins and other treasure, and used it also as a receiving place for stores and arms as long as he remained within a convenient distance.

Visit of Lombardia.

In October, 1903, the Lombardia, Italian cruiser, visited Illig, and sent boats to the shore, with a native interpreter. It was found, however, that owing to the surf the boats could not land; so the interpreter swam towards the shore, when rifle fire was opened from the rocks close to the village, on which the boats were recalled, the interpreter, with great difficulty, regaining them. On their return to the ship, the Lombardia bombarded the village and forts for several hours, with little or no result. The great thickness of the stone walls and the height of the cliffs prevented the fort on the top from being in any way searched out. The garrison were not disturbed, and no casualties are supposed to have occurred.

In October and November, 1903, proposals for a combined movement of natives by land and ships by sea, for the capture and destruction, came to nothing, owing to the impossibility of depending on the former. The Dervishes at Illig remained, therefore, undisturbed, raiding the adjacent country at their will.

Force employed in capture of Illig.

In March and April, 1904, when the columns of Sir Charles Egerton forced the Mullah, harassed and forsaken, to flee eastward into Italian territory, it was reported that Illig was his objective. There being a likelihood of this, it was decided that Illig was to be captured by assault from the sea, and permission having been granted by the Italian Government, the ships of the East Indian Squadron started forthwith; the available vessels being the Hyacinth, Captain Hon. Horace Hood, and flying the flag of Rear-Admiral George Atkinson-Willes; the Fox, Captain F. S. Pelham; and the Mohawk, Commander R. F. Phillimore; while 125 men of the Hampshire Regiment, commanded by Major Jackson, D.S.O., were divided between the ships. The passage south was occupied in organising and preparing the landing party, in arranging a water-carrying party, in making portable maxim mountings, in improving the head-covering of the sailors against sunstroke, and in preparing the boats for their work in the surf.

Squadron arrives at night.

In order to avoid an organised opposition to the landing in the surf, it was arranged that the Squadron should not arrive in daylight, so the Mohawk was sent on ahead, and anchored off Gulluli River just before sunset on April 20, and then showed the usual anchor

lights to give a mark for the arrival of the Hyacinth and Fox, without which it would have been impossible to anchor near enough to the rocky and badly-surveyed coast. These ships arrived after 10 p.m. with all lights out, and anchored close off the mouth of the Gulluli River. The Mohawk's appearance had caused the garrison to be on the alert, and scouts were sent from Illig Fort to the Middle Beach and to Gulluli River; but no other preparations were made, as the Dervishes were aware of their own strength, and confident that the crew of one small ship could do them little harm, while they already had experienced their invulnerability against bombardment from the sea. The scouts arrived abreast of the ships, and at midnight made out the shadows of the two cruisers in addition to the little Mohawk. They hurried back to the fort with the news that a considerable force had arrived; but it was too late to contest the landing in the surf of the Gulluli River, and after that their chance had gone by.

The landing.

Half an hour before dawn the advance party, in charge of Captain Hood, consisting of the Hyacinth's seamen battalion (Commander Drury Lowe) and one Maxim gun, left the ship, and was on the beach before dawn. The surf was not very bad, but still had to be considered. The boats were obliged to turn and back in on to the beach, having dropped anchor outside the breakers. The men of the advance party landed fully accoutred, strict orders having been issued against the removal of even boots. The water was up to the neck, but the men landed without mishap, charged magazines as soon as they reached dry land, and advanced forthwith up the valley of the Gulluli River, and at the first opportunity mounted the cliffs, and there held a position which commanded the landing-place, the pathway up, and the adjacent country, and was in good view of the ships at anchor. While the advance party were landing at the Gulluli River, the boats of the Mohawk made a feint at the Middle Beach, hoping to keep any of the Dervish riflemen there, instead of in the rocks and caves off the river. As soon as the heights were gained, the landing proceeded apace with quietness and regularity.

The orders issued.

The following were the principal orders for the disembarkation:—

1. Boats will be towed to within 30 yards of the beach, when the tow will be slipped and boats will be turned and backed in towards the beach, anchoring just outside the breakers. When empty the boatkeepers will haul the boats out to their anchors, and the steamboats will tow them back to their ships.

2. The landing of the entire force will require two trips of the boats.

3. If there is any difficulty in getting a boat off the beach, it is the duty of the party who landed in that boat to shove her off into deep water, however wet the men may get in so doing.

4. Boots and socks may if desired be carried round the men's necks, and put on on the beach (this does not apply to the advance party); but all other accoutrements complete are to be in place.

5. In all cases officers and petty officers will land in the same boat as their men.

The disembarkation occupied about two hours. Only one boat, a cutter of the Fox, was badly ashore, and she was successfully hauled off by a kedge anchor and grass hawser sent from the ships; and by 7.30 a.m. the little force was formed up on the plateau overlooking the landing-place as follows:—

The landing force.

On the right, a battalion, 350 strong, of the seamen and stokers of the Squadron commanded by Commander Drury Lowe; in the centre, a company of marines, 100 strong, commanded by Major Kennedy, R.M.L.I.; and on the left, the company of Hampshires, 125 strong, commanded by Major Jackson, D.S.O.; each party finding their own supports and reserves. Four Maxim guns commanded by Commander R. F. Phillimore were carried on tripods, and placed three on the right and one on the left of the line.

The following parties completed the force:—

Maxim Ammunition Party, carrying on poles eight boxes of filled belts for each maxim gun. One box was a load (and a very heavy load) for two men.

Medical Party, under Fleet-Surgeon Draper, of the Fox, with a medical staff and six stretchers (six men per stretcher); special water for the sick being carried by these spare men.

Water-Carrying Party (chiefly Seedie Boys), carrying a quarter of a gallon of water per man for the entire force landed. The water was in canvas bottles (Indian pattern "chargals," holding 1 gallon or 10 lb.). Seven bottles on a bamboo formed a load for two men.

Signalmen, Pioneers and *Armourers* completed the little expeditionary force, which amounted to about 750 men, and was commander by Admiral Atkinson-Willes in person, with Captain Hood as chief of the staff.

The men carried one day's provisions, filled water bottles, and 120 rounds of ammunition, no other spare rifle ammunition being carried.

Advance on Illig.

The force advanced in extended order with the left of the line on the cliffs overlooking the sea; the ships weighing and moving towards Illig at the same time; while the enemy, who could be seen in small numbers of about a hundred, retired gradually towards Illig.

When about a couple of miles from the fortification the entire Naval Brigade under the Flag-Captain moved away to the right, so as to envelop the position, and, this having been attained, moved direct towards the centre of the work, the left of the Naval Brigade regaining touch with the Hampshire Regiment.

A short halt was made at about 2000 yards from the fort, and then the advance steadily commenced. The enemy opened fire at about 600 yards with rifles and two very old-fashioned cannon loaded with mixed iron. The fire was returned, the little force advancing by short rushes. The Fox's companies, previously in reserve, were sent away to the right of the line, to get into action and to cut off pursuit; and finally, the Dervish fire being still maintained, the position was rushed at the point of the bayonet. The chief stand was made opposite the seamen battalion, where many Dervishes remained to die, firing from good cover at point-blank range till they were bayoneted. The enemy left between 60 to 70 dead, and had any mounted men been available there would have been as many more prisoners—men who could be seen streaming away over the hills to the right directly after the assault. The fort rushed.

The position being captured, the killed and wounded received attention, and the stretcher party commenced their journey to the beach, where the boats for the sick were lying in wait outside the surf. Sniping from the village at the bottom of the cliffs delayed proceedings, and the "Hyacinths" were ordered to clear it, which was done at the point of the bayonet, with a couple of casualties. Even after the village had been burnt to the ground, three Dervishes, with plenty of ammunition, remained in a small stone cave, with a long, narrow approach, which commanded the pathway down to the beach, and for some time could not be located. The cave was finally discovered, and the inhabitants being safe from rifle fire, the narrow passage was rushed, and the men were put to the sword. The caves on the cliffs were then searched out and cleared, and it was found that the whole of the side of the cliff was a mass of rifle pits and shelters which commanded the only path up from the beach; in one case a large cave was in communication by a tunnel with the fortification at the top. At about two p.m., everything being quiet, the Naval Brigade commenced their re-embarkation, leaving Major Jackson ashore in command of Illig Fort, with his force increased by 50 of the Royal Marine Light Infantry and four Maxim guns manned by seamen of the Squadron. The surf in the afternoon on Illig Beach was a good deal worse than had been the case in the morning at Gulluli River, and the men were obliged to wade out till the waves broke over their heads. The caves cleared.

The casualties.

The casualties to the British force were three killed (H. Johnson, leading seaman, and M. Cavanagh, ordinary seaman, H.M.S. Hyacinth, and G. Long, stoker, H.M.S. Fox) and 11 wounded, of whom four severely.

Demolition of fort.

The demolition of the Dervish fortifications commenced forthwith and continued daily. The plan shows the nature of the works, which were very elaborate and had been constructed of great strength and solidity. The walls were loopholed, but the loopholes had not sufficient splay, and to this fact the expeditionary force owes its immunity from heavy loss. The work was undoubtedly primarily intended to defend the position from attack by the sea. The walls on the top of the cliffs stretched for a considerable distance along the sea front, and embrasures for guns commanded the only path up the cliffs. Rifle-pits and defended caves existed on the sides of the steep cliffs which go down to Illig Beach, while in front of the village, and running nearly the whole length of the beach, was a wall at least 12 to 14 feet thick, well loopholed, and commanding the only place in which boats could land. In view of the fact that the surf never ceased to break on the beach, that the only path up the cliffs was exceedingly steep and was commanded both by rifles and guns the whole way up, it is not too much to say that the position was impregnable from the sea. From inland it was not so formidable, and it was too large to be efficiently defended by 200 men, so that its very extent was the cause of its undoing. If, as appears likely, it was designed by the Mullah as a refuge for himself and several hundred riflemen, it was undoubtedly a very formidable work, and would have required artillery to reduce it properly, and could even then only have been rushed with heavy loss. The guns were mounted in the blockhouses and the riflemen lined the walls, and in some cases lay down in skilfully concealed shelter outside the work. These latter were very successful, and to them the greater part of the casualties were due; but not a Dervish who occupied these trenches escaped to tell the tale.

Large working parties from the Squadron landed daily, and assisted the garrison in the demolition of the work; guncotton was freely used, as the great thickness of the walls rendered the work comparatively slow. Every evening a nasty sea broke on the beach, and re-embarkation was always a matter of great difficulty.

The re-embarkation.

On the night of April 24 a long swell, the first signs of the S.W. monsoon, set in from the southward, though the working parties landed as usual at daybreak, there being a small amount of demolition still to do. By ten o'clock this was completed, and the rising sea caused the order for the immediate embarkation of the working party and garrison. The surf was bad, and was every hour getting worse;

the difficulties were increased by a strong current setting to the northward up the coast, which made it very difficult for the boats to be kept head on to the sea. They remained well clear of the surf until required, and then approached, dropped anchor just outside the rollers, and veered away as far as possible, while good swimmers led the sternlines to the beach, which lines were well manned there to prevent the boat from getting broadside to the sea. The stores and men were embarked, and the garrison gradually withdrawn from the cliffs. The men waded out till the water was up to their necks, and then partly swam and partly hauled themselves along the sternlines till they got to the boats. This, with men fully accoutred and carrying ammunition and stores, was a work of great difficulty.

Boats wrecked.

When the embarkation was nearly complete, the Hyacinth's pinnace, with 30 or 40 men of the Hampshire Regiment, filled with water, got broadside on to the sea, and went ashore. The men behaved well, kept quiet, and when the boat struck were all able to reach the shore in safety. At the same time the Hyacinth's steam-boat, after a vain attempt to rescue the drifting launch, followed her into the breakers, and became in a few minutes a total wreck; and at the same time the Flag-Captain's gig was swamped. The men already safely in the boats were sent on board the ships, a detachment of the Hampshire Regiment reoccupied the top of the cliffs, and all the remainder of the men on the beach worked to refloat the stranded boats. The gig was soon refloated, and hauled out clear of the breakers. The steam cutter was already a total wreck, so that there only remained the pinnace to salve. For four hours the attempt continued, by which time the boat had been uprighted and pointed in the proper direction, but, despite heavy anchors sent from the ships, which were dropped well clear of the breakers, and from which a strong hawser was led, no further movement could be obtained, the boat being full of sand and water.

Shortly before sunset the embarkation was completed, leaving the stranded boat on the beach, and at early dawn the next day, when there was a slight cessation of the wind, the boat was baled out and successfully refloated. No signs remained of the steamboat. The whole of the fortifications had been levelled to the ground. All the loot of the Mullah—chiefly skins, of which there were thousands—had been embarked (a most unsavoury cargo); so that nothing remained to be done, and the Squadron departed for the north, where arrangements were made with the sultan of the Mijertain tribe to send men to Illig and prevent the reoccupation of the place by the enemies of Great Britain.

The loss of Illig was a great shock to the Mullah, depriving him as it did of his only harbour of refuge, and destroying all his stock of loot. It came also without warning, and was essentially from beginning to end one of those quick, decisive, unexpected blows that can be so well carried out by the Navy with the resources that are ever at their disposal.

CHAPTER V.

A Plea for the Study of Tactics.

Naval tactics, which deal with the movements of hostile ships and squadrons when in presence of each other, are a changing art, dependent upon qualities inherent in human nature and on the weapons employed in battle. The human element is important, because the ultimate aim in battle is to destroy the mental equilibrium of the enemy. The fundamental principles seem to be chiefly determined by the power and limitations of the weapons in use, and to be little influenced by the mechanical arrangements for moving the ships.

Early naval tactics.

In classic times the motive power was the oar and the principal weapons were the ram and the sword. The ram in the hands of the skilled Greeks was effective against the unpractised Persians, and for a time dominated tactics, but, being found too uncertain and hazardous against an equally skilled foe, was given up in favour of the sword. Ships were manœuvred to board rather than to ram. It was the failure of the ram as a weapon, and not any change in the motive power, which produced the change in tactics at that time. Although afterwards revived from time to time, and successful in skilled hands, the ram was never able to maintain itself against the sword and missile weapon throughout the galley period. In the sailing ships of the same period the same weapons were used as in the galleys. The object of their commanders was to board, as is proved by the accounts of the actions fought by the sailing fleets of England during the fourteenth century. Thus boarding tactics were common to the rowing and sailing navies so long as the sword was the chief weapon, and no important departure from them seems to have been introduced into the sailing fleets until the gun was developed. It was the great increase in gun power rather than the development of the sailing ship which led the Elizabethan seamen to adopt tactics suitable to fighting at a distance rather than hand to hand. The fact is that changes in the motive power only affect the times required to move from one position to another. They do not influence the tactical formations to be adopted, which must be those best suited to the effective use of the particular weapon employed.

The weapon governs tactics.

That tactics are governed by the weapons in use rather than by the motive power can be shown by tracing the movement of naval opinion during the steam era—that is to say, since the Crimean war, which saw the abolition of the sailing ship and ushered in the armoured ship propelled by steam. At that time the naval mind was dominated by the single idea of the close-hauled line ahead as a battle formation. Half a century of peace had diverted thought from war, and it is very doubtful whether the great body of the Navy had any clear idea of the great principles underlying the tactics of the sailing fleets. In Great Britain the value of the line ahead was questioned by Sir Howard Douglas, a distinguished artillery officer, who, in 1858, generalising from his knowledge of artillery and fortification, proposed other formations which seemed to him more favourable for the use of the gun.

Admiral Colomb.

It was not until 1865 that the question was taken up by the late Vice-Admiral P. H. Colomb, who had been employed in connection with the alterations in the Signal Book, made necessary by the experiments carried out by Sir William Martin in the Mediterranean Fleet. In that year Colomb called attention* to the weakness of the line ahead placed broadside on to meet an attack by rams. He based his argument on the decreased efficiency of the gun, but without supporting this by experimental data, although he was careful to say that "experiment only can solve most of the questions" involved.

Battle of Lissa.

In the following year, 1866, the battle of Lissa was fought, and, as is well known, the Italian single line ahead was opposed to the Austrian double quarter line. The former depended upon the gun and the latter on the ram. The Italian line was very badly formed, and the Austrian squadron passed through a large gap without any loss to either side. In the general *melée* which ensued one of the Italian ironclads was sunk, and naval opinion at once accepted the conclusion that the ram was more formidable than the gun, and that the line ahead was no longer suitable. It was not seen that the facts were altogether inconclusive—that the Austrians were not opposed to a well-formed line; that the Ré d'Italia was sunk because she happened by accident to be stopped right across the path of the Ferdinand Max; that the Palestro had been destroyed by gun fire.

Colomb read a paper† on the battle in 1867, and stated the problem to be solved thus:—"Can you, with a fleet of Bellerophons (the typical ship of those days) and the most highly-trained gunners, being in the position of the Italian Fleet, stop another fleet of

* Paper read at R.U.S. Institution, February 28, 1865: "Modern Naval Tactics."
† "Lessons from Lissa." Read at the R.U.S. Institution, April 29, 1867.

Bellerophons, coming down upon you in the position and with the intentions of the Austrian Fleet, by means of your artillery fire?" He asked for experiments to test the accuracy of artillery fire under such conditions. The necessity of experiments to determine the accuracy of the ram does not seem to have been appreciated at the time. For many years no experiments of any sort were carried out, and no attempt was made to determine whether the line ahead was as weak as was supposed, but all navies proceeded to build rams. As we now know, the arguments in support of them were based on quite inconclusive data.

Colomb's papers, 1871–2.

It was not until 1871 that Colomb returned to the subject* and applied the more rigorous inductive method in lieu of the loose arguments which he had before used. His plan was to investigate closely the capabilities of the weapons—the gun, the ram, and the torpedo—and then to apply the conclusions to actions first between single ships and afterwards between fleets. The Naval Service is immensely indebted to him for starting on sound lines a discussion which, after many years, has borne good fruit. He was met at the outset with the complete absence of reliable experimental data, and was obliged to use such as were available. It is not surprising that his arguments from unreliable data led to conclusions which were afterwards found to require revision.

The ram.

The experimental data required to determine the accuracy and efficiency of the ram as a weapon are correct facts relative to the path of a ship when turning under helm. In 1871 Colomb, in the absence of the experiments, assumed that the path was circular, but he was fully aware that his data were imperfect, and was careful to limit himself to the opinion that his conclusions probably only approached the truth. His main deduction was that ramming was not a difficult task, but could be effected by superior skill with vessels otherwise equal. A ram whose turning powers were much greater than her adversary's might attack her with every confidence of success. It was not until 1877 that the turning trials of H.M.S. Thunderer gave the correct facts and proved that the path was not circular. They were followed from time to time by other trials, but the full value and meaning of the facts placed at their disposal were not completely realised by the Naval Service as a body until the loss of the Victoria in 1893, when the Admiralty ordered the captains of ships to make more complete trials than had hitherto been made.

The gun.

The efficiency of the gun as a weapon depends upon the number of hits which can be made in a given time by a ship at sea firing at

* "The Attack and Defence of Fleets." Read at the R.U.S. Institution, April 3, 1871, and January 15, 1872.

another ship, and upon the effect produced by each hit. The latter has been repeatedly settled by actual trial on the practice ground, but no experimental data in any way reliable existed in 1871 to determine the former. Colomb pointed out the necessity of obtaining this information in 1867 and again in 1871, and since then other writers have called attention to the same point; but, strange as it may appear, no reliable experiments were carried out until 1904—more than a generation after the necessity for them had been pointed out.

Colomb's conclusions.

From the imperfect data at his disposal Colomb came to the conclusion that only about 10 per cent. of the shots fired from a sea-going ship of the Monarch type would take effect upon another ship broadside on and at a fixed distance of 1000 yards, and that the highest rate of fire which could be calculated on was one round in three minutes. The damage done was not easy to estimate, but, except at close quarters, was held to be small, and when received end on was considered to be *nil*. The broad result was that the ram was held to be superior as a weapon to the gun. Arguing on this as a basis he held that the end-on position would be assumed by hostile ships and fleets; that, although the ram was the chief weapon and would dominate and prescribe the formation, it would not be used in fleet actions, because the ship attacked would be covered by the ship next to her in the line; that, as the broadside gun would be used in default of the ram, line abreast would be inadmissible, and that consequently fleets would approach each other and engage in single line ahead. This view appears to have been accepted by the Service, and to have been held for upwards of twenty years, as it was practised by Sir G. Tryon in the Mediterranean Fleet in 1892, and presumably represented his intentions at that time. Although not remarked at the time, the influence of the ram had turned the line of battle through a right angle.

Admiral H. J. May. The ram unreliable.

These papers of Colomb's have been dwelt upon at length, because they indicated the only safe method of attacking the problem, and because their influence on opinion remained until the same method was applied with closer reasoning, and the advantage of more accurate experimental data by the late lamented Rear-Admiral H. J. May, in two remarkable papers* in 1897. During the interval of twenty-six years which had elapsed since the paper read by Colomb, sufficient data had been accumulated, mainly through his persistent efforts, to enable May to prove that, even with the highest skill and best possible ship, ramming must always be a most hazardous undertaking.

* "Notes on Tactics for Ships and Weapons of the Present Day."—*Royal United Service Journal*, Vol. xli., pp. 48 and 201.

Thus, upwards of thirty years after the battle of Lissa, the ram was shown to be unreliable. We have come to the same conclusion, and probably for the same reason, as the Greeks, who, upwards of 2000 years ago, gave up the uncertain ram for the—at that time—more reliable hand-to-hand fight.

In 1897 sufficient experimental data did not exist to fix the powers and limitations of either the Whitehead torpedo or the gun. May assumed the effective range of the former at 600 yards. This is certainly within the limit at the present time, but extended and careful experiments at sea are required to determine the accuracy. Such experiments as have been carried out are believed to show that the difficulty of hitting with it even much within fighting ranges has been much underestimated. **The Whitehead doubtful.**

The outside effective range of the gun was assumed to be 3000 yards, or 5000 yards when chasing. We know now that these distances may be much increased, and that any ship which attempts to push inside of 4000 yards of a battleship's broadside, properly served, without first silencing some of her guns, must expect to suffer serious damage and loss. This is an additional reason for discarding the ram, and also indicates that the Whitehead torpedo cannot be counted on until its range and accuracy have been largely increased, and proved by experiments at sea to have been so. The gun alone remains as the weapon to be relied upon in action. The question put by Colomb in 1867 has at last been answered. Reliable experiments have shown that a squadron in line ahead, with its gun fire, can stop a similar squadron approaching in line abreast from the beams bearing or thereabouts. It is true that May rightly held this view in 1897, but it was only opinion, and was unsupported by fact previous to experiments carried out in the Mediterranean in 1904 and the experience of the Russo-Japanese war. **The gun alone reliable.**

The underestimate of the power of the gun, due to the want of experiment at the time May wrote, led him to attach undue value to speed. He claimed that it gave choice of weapons, but this cannot be so, as there is only one weapon—the gun. His arguments killed the ram, and such experiments as have been carried out since he wrote have tended to destroy the Whitehead as a weapon for use by battleships. Again, the claim that it gives choice of range is only true to a limited extent. The enemy's broadside fire has to be reckoned with, and may compel a turn away, thus fixing the minimum range. Whether speed gives any tactical advantage beyond the power to accept or refuse action is still a very doubtful question, and will remain so until the question is properly investigated and tested by experiments. **Value of speed.**

Value of historical study.

If the gun is the chief and only reliable weapon of the modern fleet, as it was formerly of the sailing fleet, and the weapon governs tactics, it may be that the principles involved are the same whether the ships be propelled by sails or steam. What were the principles underlying the tactics of Monk and De Ruyter, of De Suffren and Nelson? History alone can answer. The works of Hoste, De Morogues, and Clerk of Eldin must be studied. We must critically examine, not only the accounts of the battles at sea fought during the sailing era, but also the old fighting instructions under which the admirals acted. These instructions, which originated during the Dutch wars, and show the gradual evolution of naval opinion during two centuries, are of extreme importance, and are now being most opportunely printed for the Navy Records Society under the able editorship of Mr. Julian Corbett. His work will merit the close attention of all those, whether professional or not, who are interested in sea power. It will furnish an additional proof, if such were needed, of the value of that society, and will show indirectly the wisdom of the late Board of Admiralty, who, in the year 1900, inaugurated the study of war at the Greenwich College, and thus encouraged thought and research both inside and outside the naval profession.

Principles of sailing tactics.

The principles underlying the tactics of the sailing fleets were quite simple. As set forth by Hoste, De Morogues, Clerk of Eldin, and practised by De Ruyter and Monk, by Torrington and de Tourville, by De Suffren, Rodney, and Nelson, they may be summarised thus:—

1. A fleet should be so disposed on going into action that no part can be attacked without being supported by the remainder within a *reasonable* time.

2. A fleet should be taken into action in such a way as to bring a great superiority to bear on a part of the enemy before that part can be supported by the remainder.

Battle of St. Vincent.

These principles are best explained by reference to battles in which they have been applied. The two most instructive instances are the battles of Cape St. Vincent (February 14, 1797) and Trafalgar (October 21, 1805). The leading features of the former are well known. The wind on that day was W. by S.; the Spanish weather division of twenty-one ships was steering E.S.E. to rejoin their lee division of five or six ships, which were some way to leeward and standing close hauled on the port tack. The British Fleet of fifteen ships in a closely formed single line on the starboard tack passed through the gap, obliging the greater part of the Spanish weather division to haul up to N. by E. It is evident that if the whole of

the British ships had stood on and tacked in succession, the Spanish weather division would have passed astern and rejoined the division to leeward. It is Nelson's great merit that he saw the importance of preventing this, and frustrated it by wearing and standing across the track of the Spanish weather division to head them off. Sir John Jervis took his fleet into action in a single close-hauled line, so that his ships could mutually support each other without delay, whereas the Spanish force was so disposed that the weather division was exposed to attack without a possibility of support from the ships to leeward within a reasonable time. The Spanish Fleet may be considered to have been ranged parallel to the line of the wind, whereas the British line was six points from it. The two lines were nearly at right angles to each other, and the British attack divided the Spanish Fleet. The disposition of the British Fleet was correct in principle, whereas that of the Spanish was entirely incorrect, in that the ships to leeward were in the worst possible position for supporting those to windward.

The single line ahead.

The practice of ranging a fleet for battle in single line ahead on either of the two lines of bearing, each of which made an angle of six points with the wind, originated during the Dutch wars of the 17th century, and was fully explained by Hoste in his *Treatise on Tactics*, published in 1697. The single line ahead was adopted because it gave a clear field of fire to the principal weapon—the guns mounted on the broadside—and was best adapted to keep station and give support as each ship moved up automatically. The lines were kept close to the wind because on those lines the fleets were more nearly on an equality than on any other, and because each tried usually to get into a position to windward, which was held to confer some advantages. Thus the direction of the line in a sailing fleet, being dependent upon the wind, was fixed, and as the two fleets were usually ranged in parallel lines it came about that each was drawn up nearly at right angles to the bearing of the other. The arguments in favour of the single line ahead formation are equally applicable to modern fleets, as their broadside is superior to their end-on fire, but the direction of the line in a steam fleet, not being dependent on the wind, is determined by the necessity of ensuring that all the broadside guns will bear when the ships are turned up to engage, which means that the line must be maintained nearly at right angles to the bearing of the enemy. The conclusion is the same whether the fleets be moved by sail or steam. The capabilities for defence of a single line so formed were shown by the repeated failures of our attempts during the 18th century to bear down and attack a fleet ranged in single line to leeward.

Battle of Trafalgar.

Nelson's proposed plan of attack previous to Trafalgar, as explained in his memorandum dated October 9, 1805, provided for an attack either from the leeward or the windward. The two attacks were identical in principle; each was to be directed against the enemy's rear, while the interference of his van was to be prevented. In method the essential difference was that the attack from the leeward directed each division to cut through the enemy's line in line ahead, while that from the windward ordered the ships to break through in line abreast. The attack from the windward assumed the enemy to be on a wind, and ranged in one line to leeward, and the British Fleet to be in three columns, nearly within gunshot to windward of the enemy's centre. The lee British column of sixteen ships, under the second in command, were to bear up together and attack the twelve rear ships of the enemy. The remaining two columns, under the personal control of the Commander-in-Chief, were to prevent the van and centre of the enemy interfering with the movements of the second in command. In other words, the van of the enemy was to be "contained"—that is prevented going to the assistance of their rear, which was to be overwhelmed by a superior force. As is well known, the actual attack was not carried out exactly as arranged in the memorandum. Whether by accident or design, the British ships, in two columns, bore down more or less in line ahead instead of line abreast. But the principle was adhered to in that the attack was made on the rear, and Nelson did go into action in such a manner as to cover Collingwood from interference by the Franco-Spanish van. The importance of thinking out principles is shown by the fact that the plan, being correct in principle, was still applicable although the execution differed in detail from the forecast.

The value of time.

It will be noted that much depends upon the time given to bring up supports to the assistance of the ships attacked. This interval is measured by the time required to silence or beat a ship in close action, which is apparently as short now as it was in the past, seeing that the Shannon beat the Chesapeake in eleven minutes and the Varyag was silenced in fourteen minutes. At St. Vincent and Trafalgar the speed was about three knots, and in those days long range may have been something less than 2000 yards and close action 200 yards or less. If ships can only be moved in any particular direction one mile in twenty minutes with a fair wind, or at most one-third of that distance with a foul wind, and are to mutually support each other, it is not difficult to understand the importance which our forefathers attached to keeping them in line on a wind well closed up.

At the present time the speed in action may, at a moderate estimate, be taken as twelve knots as against three, and steamships command a much greater variation of speed than sailing ships. On the other hand, distances are greater. Higher speeds may be to some extent balanced by longer distances to be traversed. Long range may now be 8000 yards and close action anything within 4000 yards, so that ships can help and sustain each other by their fire from longer ranges, especially if the guns are given large arcs of fire. While, therefore, concentration on a part of the enemy is still the main object, and the line ahead is still the best formation for bringing the guns into action and for mutual support, it may be permissible within limits to open out the interval between the divisions for a special tactical purpose.

Dividing the enemy.

Instances can be cited of attempts to gain a tactical advantage either by dividing the enemy or by concentrating on his van, on his centre, or on his rear. The different methods of making these attacks have been fully discussed by Hoste, De Morogues, and Clerk of Eldin, whose works are still instructive and deserving of close study. The practice of dividing the enemy by breaking through his line was frequently used during the Dutch wars of the 17th century, but without any particular tactical method; and it does not seem to have met with any marked success. Hoste, the mouthpiece of De Tourville, and De Morogues following him, were against it, but Clerk was for it and Nelson adopted his plan. Rodney at Dominica and Jervis at St. Vincent are the two most successful examples. Opportunities to put it into practice may again offer, but the power of free movement which ships now possess seems to make it easy to double on any hostile ships which interpose between the parts of a fleet.

Objections to attacking the van.

Concentration on the van of a fleet under way has not been much practised, and has never met with much success. The best known instance is the attack of Monk on the van of De Ruyter in the action on June 1, 1666. In this battle the inferior English Fleet was to windward, and bore down on the Dutch van with the intention of crushing it before it could be supported by the centre and rear, which were some way to leeward. The attack failed, and when the ships engaged tacked they found that they had fetched so far to leeward during the engagement that the Dutch centre and rear weathered on them, brought them to action, and inflicted much damage. This is a typical example of the objection raised by Hoste to an attack on the van. The ships in the rear automatically come up to help and cover their own ships and to attack those of the enemy which may have lost ground from any cause during the

action. The objection is quite independent of the motive power, and is valid, whether the ship be moved by sail or steam. The argument in favour of attacking the van was that if the leading ships were disabled the enemy's line would be thrown into disorder, but this was not admitted by Hoste, and does not seem to have appealed to the seamen of those days. Writing nearly a century later, Clerk of Eldin showed from the actions of Byng, Arbuthnot, and Graves that when the attack was made on the van the attacking fleet while closing suffered more than the defending fleet waiting to leeward.

Attack on the centre.

The battle of Providien, on April 12, 1782, is an example of an attack on the centre. De Suffren in this case, taking advantage of the English rear being astern and to leeward, concentrated on their centre while containing their van. Had the rear been in proper station he would no doubt have concentrated on the rear, as he did both in earlier and later actions. This action is quoted to show the necessity on the one hand of being ready to adapt a plan to circumstances, and on the other of keeping ships in station and well closed up.

Attack on the rear.

Concentration on the rear is free from the objection raised to an attack on the van, and was usually coupled with an attempt to "contain" the van. It seems to have originated during the Dutch wars, and to have been included in the 1673 Fighting Instructions, but afterwards omitted. De Ruyter appears to have attempted to apply the principle at the battle off the Texel in August, 1673. Torrington used it successfully at Beachy Head in 1690, and De Tourville at La Hogue in 1692. Both Hoste and de Morogues recommended it. Rodney, who had lived in France for some time and may have been abreast of the French naval opinion, tried to attack the rear on April 17, 1780. He was foiled by De Guichen, who wore immediately, forcing him to haul to the wind on the same tack, and thus showed the correct way to meet such an attack. De Suffren, in his order of June 14, 1783, arranged to double on Hughes' rear with part of his force, while his remaining ships contained the English centre and van. But the classical instance is Trafalgar, already quoted, and is due to Clerk of Eldin, whose plan was adopted by Nelson and made his own. No stronger example could be given of the immense importance of the study of tactics, but for practising them in time of peace an equally strong instance can be quoted.

Practice of tactics in peace.

Mention has already been made of the actions of Byng in 1756, of Graves and Arbuthnot in 1781, in each of which the French assumed the leeward position and awaited attack. As de Morogues' book, published in 1763, contains instructions for conducting a sham fight under the conditions which prevailed in Byng's action, it is extremely

probable that their squadrons were practised in rehearsing that action. If that was the case, French officers would have fully understood what to expect from such attacks as those of Arbuthnot and Graves, and must have been well prepared to meet them. The very contrary was the case during the war of the French Revolution, when their Navy had cause to lament the want of tactical training of their officers.

A new departure in 1900.

The tactical exercises which have been carried out of late years are, therefore, not a new idea. The annual manœuvres previous to 1900, with the exception of those carried out in 1891, did not teach any tactical lessons, because they were subject to fixed rules for engaging, which completely fettered the hands of the officers in command, and inculcated the pernicious idea that mere numbers as opposed to skill and quality must win. Under the spirit of those rules Admiral Togo should have avoided action with the Russian Fleet on August 10. In 1900 the Board of Admiralty caused the rules to be entirely altered. Officers in command were left entirely free to act as they would act in time of war, subject, of course, to the proviso that the ships should not be hazarded. The change was momentous, but was not understood at the time. The effect was not fully realised until the following year, when Sir A. Wilson and Sir G. Noel, taking full advantage of the new conditions, met off the Lizard and initiated a great departure in the teaching of tactics. Since that date some progress has been made, but much remains to be done.

Summary

The solution of the tactical question depends upon the twin sisters—historic truth and experimental fact. Research has not yet placed at our disposal sufficient historical material, but the harvest is being rapidly garnered. Experiments have given us some facts, but many more are required. The time is not yet quite ripe for a full discussion, but this sketch may perhaps serve to incite the labourers in the field to fresh exertions by showing the practical and living importance of the work. It has been written with the object of showing that tactical principles are dependent upon the weapons in use and not on the motive power; that changes in tactics are due to changes in weapons, which can be largely determined by careful experiments in time of peace; that history has as many lessons to teach in tactics as it is admitted to have in strategy; that both study and practice are necessary, and promise to lead to as much success in the future as they invariably have in the past. It has not been possible in the limited space to show the influence of tactics on construction, but it would not have been difficult to prove that they exercise a dominating ascendancy, and that the expenditure of large sums of money must depend upon the correct solution of tactical questions.

R. N. CUSTANCE.

CHAPTER VI.

THE DOGGER BANK AND ITS LESSONS.

Introduction.

IT will best serve the purpose of the following pages—which is in no sense to discuss the affair of the Dogger Bank controversially from an international point of view—to accept the conclusions of the International Commission of Inquiry and to state the facts, as far as possible, in the language of its Report. The French text of the Report will be quoted where necessary, as no authoritative English version seems to have been issued.

Warnings received by Admiral Rozhdestvensky, and measures taken by him.

While anchored at the Skaw, and indeed previously since the departure of the fleet under his command from Reval, Admiral Rozhdestvensky had received "nombreuses informations des Agents du Gouvernement Impérial au sujet de tentatives hostiles à redouter, et qui, selon toutes vraisemblances, devaient se produire sous la forme d'attaques de torpilleurs, en outre, pendant son séjour à Skagen, l'Amiral Rojdestvensky avait été averti de la présence de bâtiments suspects sur la côte de Norwège." One of his transports coming from the north also reported having seen four torpedo craft exhibiting only a single masthead light. This information naturally induced the Commander-in-Chief to take every possible precaution for the protection of the ships under his command against torpedo attack. He left the Skaw twenty-four hours earlier than he originally intended, sending off his fleet in six separate "échelons," his own "échelon" consisting of the battleships Suvaroff, Alexander III, Borodino, and Orel, and the transport Anadyr, leaving last at 10 P.M. on October 20. The two leading "échelons" were ordered to steam at twelve knots, and the remainder at ten. The course prescribed appears to have led close to the Dogger Bank, well known to all pilots and mariners as a place where fishing vessels of many nations are likely to be met with in large numbers. This is not the direct course from the Skaw to the English Channel, but an admiral having any reason to expect a torpedo attack would naturally avoid the course on which his assailants would be most likely to look for him. On the other hand, a navigator who sets his course so as to pass near the Dogger Bank must be assumed to know that he will find there a large assemblage of fishing craft.

One of the "échelons," preceding that under the Admiral's immediate command, consisted of the transport Kamchatka, escorted by the cruisers Dmitri Donskoi and Aurora. Owing to "une avarie de machine," the Kamchatka fell astern, while her escorting cruisers went on at the prescribed speed, with the result that by 8 P.M. on October 21 she was some fifty miles astern of the rear "échelon" of the fleet. In this position she met the Swedish vessel Aldebaran and several other craft, and, mistaking them for torpedo craft, she opened fire upon them, sending a wireless message to the Commander-in-Chief at 8.45, to the effect that she was "attaqué de tous côtés par des torpilleurs." This message was duly received by Admiral Rozhdestvensky, and naturally put him still more on the alert, inducing him "à signaler à ses bâtiments vers 10 heures du soir de redoubler de vigilance et de s'attendre à une attaque de torpilleurs." The significance of this warning would be emphasized by the fact that the Commander-in-Chief had previously issued a standing order whereby each "officier chef de quart" had been authorized "à ouvrir le feu dans le cas d'une attaque évidente et imminente de torpilleurs. Si l'attaque venait de l'avant il devait le faire de sa propre initiative, et, dans le cas contraire, beaucoup moins pressant, il devait ev référer à son Commandant." A majority of the Commissioners considered that, having regard to all the circumstances, there was nothing excessive in these orders.

Experiences of the Kamchatka.

The Kamchatka having reported herself as some fifty miles astern, when she believed herself to be attacked between 8 and 9 P.M., Admiral Rozhdestvensky might very well calculate that the torpedo craft reported by her would overtake his own squadron about 1 A.M. on the following morning, October 21. His course was south-westerly, and this brought him towards that hour into close proximity to the Dogger Bank and its fishing craft. There were some thirty vessels there, spread over a space of several miles, and the Commissioners state, without reserve, that all the vessels "portaient leurs feux réglementaires et chalutaient conformément à leurs règles usuelles, sous la conduite de leur maître de pêche, suivant les indications de fusées conventionelles." Of the preceding "échelons" which had passed near them, none had reported by wireless telegraphy anything suspicious or unusual in their proceedings, and in particular Admiral Fölkersahm, who had passed with his "échelon" to the northward of them, had examined them closely with his searchlights "et, les ayant reconnus ainsi pour des bâtiments inoffensifs, continua tranquillement sa route." Shortly after Admiral Fölkersahm had passed, the last "échelon" arrived in the neighbourhood of the fishing fleet. "La route de cet échelon le conduisait à

Arrival at the Dogger Bank, and what happened there.

peu près sur le gros de la flotille des chalutiers, qu'il allait donc être obligé de contourner, mais dans le sud." This would seem to imply that instead of passing round the fishing fleet on the north, as Admiral Fölkersahm had done, Admiral Rozhdestvensky found that his course would take him "sur le gros de la flottille," and would have altered course accordingly to the southward, so as to leave the flotilla on his starboard hand, but for a series of occurrences which at the moment began to arrest his attention, and apparently induced him to keep his course and pass through the flotilla, though more to the southward than the northward. He would therefore have fishing boats both to port and to starboard of him throughout the subsequent proceedings. By the first of these occurrences—the firing of a green rocket, to wit—the already tense apprehension of the officers on the bridge of the flagship was still further quickened. Such an occurrence in such circumstances might well seem to wear a suspicious aspect to officers who were at the moment on the look-out for an immediate attack by torpedo craft; but in reality this fatal rocket was merely the regular signal by which the admiral of the fishing fleet indicated to his consorts that they were to shoot their starboard trawls.

A suspicious vessel observed ahead and fire opened on her.

Very shortly after the display of this alarming but wholly innocent signal the officers of the Suvaroff eagerly scanning the horizon through their night glasses discerned "'sur la crête des lames dans la direction du bossoir a tribord'"—that is, over the starboard cathead—"'et à une distance de 18 à 20 encablures un bâtiment qui leur parut suspect parce qu'ils ne lui voyaient aucun feu et que ce bâtiment leur semblaient se diriger vers eux à contre-bord." This is their own deposition. Twenty cables are 4000 yards or two nautical miles. The extreme beam of the largest torpedo craft is less than 24 feet or 8 yards, and the vessel now entering on the scene is reported to have been advancing end on "à contre-bord." The Commissioners report that at the time "la nuit était à demi obscure, un peu voilée par une brume légère et basse." To have discovered so small an object at so great a distance on such a night reflects infinite credit on the vigilance of the discoverers and their keenness of vision, but it also shows that they could not well have overlooked such of the fishing boats as were nearer to them, and were all carrying their regulation lights. Anyhow, "lorsque le navire suspect fut éclairé par un projecteur les observateurs crurent reconnaitre un torpilleur à grande allure." The speed of the Suvaroff was ten knots. "Grande allure" for a torpedo craft advancing to the attack can hardly be put at less than twenty knots. The two craft were thus approaching each other at the rate of thirty knots—that is,

a nautical mile in every two minutes. As they were only two nautical miles apart when the "navire suspect" was first sighted, they would be abreast of each other in four minutes. All who have any practical experience of the use of the searchlight in such circumstances must acknowledge that it was handled with consummate skill by the officers of the Suvaroff on this occasion, but at the same time they will draw the irresistible inference that the speed of the advancing vessel must have served to differentiate it absolutely from any of the fishing craft in its neighbourhood. Be this as it may, the Commissioners go on to say, "C'est d'après ces apparences que l'Amiral Rojdestvensky fit ouvrir le feu sur ce navire inconnu"; and to this they append the following comment: "la majorité des Commissaires exprime à ce sujet l'opinion que la responsabilité de cet acte and les résultats de la canonnade essuyée par la flottille de pêche incombent à l'Amiral Rojdestvensky." Unless the word "responsabilité" be here taken in some esoteric sense it is hard to see why anyone should have dissented from a proposition which is almost self-evident. It hardly needs an International Commission to declare that a Commander-in-Chief is responsible for an act done by his orders and for all the consequences it entailed, and would ill become the "valeur militaire" of any admiral to disclaim such responsibility.

Orders given not to fire on the fishing boats.

Almost immediately fire was opened a small vessel was observed right ahead of the Suvaroff, and so close that course had to be altered to port to avoid her. Illuminated by a searchlight this vessel was seen to be a trawler. Accordingly "pour empêcher que le tir des vaisseaux fût dirigé sur ce bâtiment inoffensif, l'axe du projecteur fut aussitôt relevé à 45° vers le ciel"—this being apparently a signal preconcerted for the purpose. "Ensuite l'Amiral fit adresser par signal a l'escadre l'ordre de ne pas tirer sur les chalutiers."

Sequence of events and their rapidity. Undue prolongation of the fire.

It may not here be amiss to recapitulate the succession of events, all of which must have taken place within four minutes, if the suspicious vessel which caused the Suvaroff to open fire was steaming at twenty knots, while two minutes more at the same speed would have taken her astern of the whole squadron. These are—(1) discovery of a suspicious vessel on the starboard bow at a distance of eighteen or twenty cables; (2) her recognition by means of the searchlight as a torpedo craft steaming at high speed; (3) order given to open fire on her; (4) discovery of a small vessel right ahead of the Suvaroff; (5) course altered to port in order to avoid her; (6) her recognition as a trawler by means of the searchlight; (7) signal made not to fire on the trawlers. The outside allowance of time within which all these things must have happened is from seven to eight minutes, even if the speed of the suspicious vessel was

not more than fifteen knots, and at the end of that period the vessel in question must have been well astern of the rear ship of the Russian line, having towards the close of it passed the latter on its starboard side, and therefore between it and such vessels of the fishing fleet as were situated to the northward. It would have been little short of a miracle in the circumstances for all the vessels of the fishing fleet so situated to have escaped injury, however unintentionally inflicted; and as the fire of the Russian Squadron lasted, according to the Commissioners, from ten to twelve minutes, it would seem that the conclusion at which a majority of them arrived can hardly be seriously disputed:—"la durée du tir à tribord, même en se plaçant au point de vue Russe"—an expression which seems to imply that some of the Commissioners found no little difficulty in adopting this attitude—"a semblé à la majorité des Commissaires avoir été plus longue qu'elle ne paraissait nécessaire." There is nothing to show that any order was given by the Admiral to fire on any vessel other than that which originally aroused his suspicions and caused him to open fire. It does not appear that any other suspicious vessel was observed on the starboard hand. The suspicious vessel in question must, as we have seen—"d'après les dépositions des témoins," to borrow a convenient phrase of the Commissioners—have passed well astern of the Russian line in less than eight minutes. Yet the fire was continued for ten or twelve minutes in all. Unless, therefore, the Russian ships were firing entirely at random they must have been firing, however unwittingly and unintentionally, at the unoffending trawlers on their starboard hand and at nothing else.

Suspicious vessel not identified.

What the suspicious vessel was the Commissioners do not attempt to determine. The Aurora was certainly hit several times in the course of the firing. But beyond suggesting that the Aurora, steaming in the same direction as the fleet and showing no lights astern, may have been the vessel which originally aroused suspicion on board the Suvaroff and induced Admiral Rozhdestvensky to open fire, the Commissioners were apparently unable to ascertain where she was or how she came there. The Dmitri Donskoi was also present, since her identification by the Commander-in-Chief after she had made her number, induced the latter to make a general signal to cease fire. But the precise position of the Dmitri Donskoi whether to port or starboard of the Russian line is not determined by the Commissioners. It only remains to add at this stage of the narrative that if the conjecture of the Commissioners that the Aurora was the suspicious vessel in question is well founded, and if as they also suggest she was steaming in the same direction as the fleet, her

relative bearing and distance could not have changed materially, so that the original belief of the Commander-in-Chief and his staff that the suspicious vessel was a torpedo craft steaming towards the fleet "à contre bord," and "à grande allure," must have been promptly disallowed by the event. In that case the continuance of the starboard firing for ten or twelve minutes becomes more incomprehensible than ever.

The firing to port and its alleged object. Confusion in the fleet.

So much for the starboard firing. The cause of the firing to port is even more obscure. Just as the trawler above-mentioned was discerned right ahead of the Souvoroff and course was altered in order to avoid her, "les observateurs du Souvoroff aperçurent à bâbord un autre bâtiment qui leur parut suspect, à cause de ses apparences de même nature de celle de l'objectif du tir par tribord. Le feu fut aussitôt ouvert sur ce deuxième but et se trouva ainsi engagé des deux bords." It is here stated by the Commissioners that, according to the standing orders previously issued to the squadron, "l'Amiral indiquait les buts sur lesquels devait être dirigé le tir des vaisseaux en fixant sur eux ses projecteurs." Everyone who has any practical experience of torpedo operations will recognise at once that such a method of indication is exceedingly vague and very apt to be misleading, even when the searchlights are worked from the flagship alone. If other ships in company are working their searchlights more or less at random at the same time confusion and misunderstanding are inevitable; at least, such is the opinion of the Commissioners, and no naval officer will dispute it. "Mais comme chaque vaisseau balayait l'horizon en tout sens autour de lui avec ses propres projecteurs pour se garer d'une surprise, il était difficile qu'il ne se produisît pas de confusion." In this confusion, either by sheer accident or through a mistake, quite intelligible and far from inexcusable in the circumstances, the majority of the injuries sustained by the trawlers would seem to have been inflicted. It is clear that Admiral Rozhdestvensky personally did all he could from first to last to prevent the fire of his squadron being directed on any of the trawlers distinctly recognised as such, and the Commissioners record their unanimous opinion to this effect. But had he been an angel from heaven his efforts must have been unavailing in the situation as described by the Commissioners.

Findings of the Commissioners on the foregoing proceedings.

The majority of the latter declare that the starboard fire was, in their judgment, unduly prolonged. They hesitate to record the same opinion regarding the firing to port, on the ground that their information on the subject was insufficient, and it must be acknowledged that on this and several other points the Russian case was allowed to go by default. None of the logs of any of the ships allowed were produced. The Russian witnesses were few, and their

testimony threw little light on the more obscure aspects of the situation. Nevertheless a majority of the Commissioners recorded their conclusion in no ambiguous terms: "La majorité de Commissaires constate qu'elle manque d'éléments précis pour reconnaître sur quel but ont tiré les vaisseaux, mais les Commissaires reconnaissent unaniment que les bateaux de la flotille n'ont commis aucun acte hostile; et la majorité des Commissaires étant d'opinion qu'il n'y avait, ni parmi les chalutiers, ni sur les lieux aucun torpilleur, l'ouverture du feu par l'Amiral Rojdestvensky n'était pas justifiable." This opinion, however, was not shared by the Russian Commissioner, who, on the contrary, recorded his opinion "que ce sont précisément les bâtiments suspects s'approchant de l'escadre dans un but hostile qui ont provoqué le feu."

The Russian Fleet proceeds on its way. Remarks of the Commissioners on its omission to stop and communicate.

The order to cease fire was given as soon as the Dmitri Donskoi was identified by Admiral Rozhdestvensky, and then "la file des vaisseaux continua sa route et disparut dans le sud-ouest sans avoir stoppé." The fact that they did not stop to ascertain what damage had been done, and to render such assistance as might be required by the innocent victims of the cannonade, has naturally been severely criticised in many quarters. But the Commissioners exonerate Admiral Rozhdestvensky on this point: "Les Commissaires sont unanimes à reconnaître, qu'après les circonstances qui ont précédé l'incident et celles qui l'ont produit, il y avait à la fin du tir assez d'incertitudes au sujet du danger que courait l'échelon des vaisseaux pour décider l'Amiral à continuer sa route." Notwithstanding this, however, the majority of the Commissioners express their regret that Admiral Rozhdestvensky "n'ait pas eu la préoccupation, en franchissant le Pas de Calais, d'informer les autorités des Puissances maritimes voisines qu'ayant été amené à ouvrir le feu près d'un groupe de chalutiers, ces bateaux, de nationalité inconnue, avaient besoin de secours." Though this regret was not unanimous at the Commission it will hardly find a dissentient elsewhere. The stern and urgent necessities of war may, as the Commissioners acknowledge, take precedence of the claims of humanity at the moment of conflict. They cannot excuse or even extenuate indifference to those claims after the emergency is past.

Final conclusion of the Commissioners, with remarks thereupon.

Finally, the Commissioners declare "que leurs appréciations . . . . ne sont pas dans leur esprit de nature à jeter aucune déconsidération sur la valeur militaire ni sur les sentiments d'humanité de l'Amiral Rojdestvensky et du personnel de son escadre." If the purpose of these pages were controversial this conclusion, apparently so inconsistent with the previous findings, might invite some criticism. But the Commission was neither a judical tribunal nor a diplomatic

conference. It combined some of the characteristics of both. Its abnormal composition is reflected in the several paragraphs of its Report. On essential points judgment is given against Admiral Rozhdestvensky. The trawlers are exonerated altogether. Their conduct was unimpeachable throughout. There was nothing in it to arouse a shadow of suspicion. The responsibility for opening fire and for all that ensued is thrown upon Admiral Rozhdestvensky. There were no torpedo craft "ni parmi les chalutiers ni sur les lieux." Admiral Rozhdestvensky was not, therefore, justified in opening fire. Even on his own showing the starboard fire was unduly prolonged. As to the firing to port, the evidence produced—by no means all that might have been produced—is insufficient to sustain a similar conclusion, so that "not proven" is here the verdict rather than "not guilty." Admiral Rozhdestvensky did all he could to prevent injury to fishing boats, but in the confusion caused by his opening fire without adequate justification his efforts were unavailing. He was not called upon to stop in the midst of what he regarded as imminent danger, but he was called upon to report the incident to the Powers interested at the earliest possible moment. These are the judicial aspects of the Commission's finding. Then diplomacy steps in and seeks to soothe military and national susceptibilities by declaring that Admiral Rozhdestvensky's "valeur militaire" is unimpaired, and his "sentiments d'humanité" unimpeachable. Those who are best qualified to appreciate the full weight of the judical censure will probably be the last to demur to the diplomatic gloss.

What was it that provoked the Russian fire?

Now, the problem which still awaits solution is to determine what it was that first provoked the Russian fire. It cannot have been the fishing fleet—that is quite clear. When Admiral Rozhdestvensky set his course so as to pass close to the Dogger Bank, he must have known that at that point he would probably come across a large assemblage of trawlers. If he did not know this, either his nautical incapacity, or his flagrant neglect of information which is common to all competent mariners, stands confessed. The green rocket may well have puzzled him, but it should not have made him see torpedo craft or other hostile vessels where there were none to be seen. The majority of the Commissioners record their conviction that no torpedo craft were there. The Russian Commissioner, on the other hand, stoutly adhered to his conviction "que se sont précisément les bâtiments suspects s'approchant de l'escadre qui ont provoqué le feu." The Dmitri Donskoi and the Aurora do not answer to this description, because the only way in which the Commissioners attempted to explain the Aurora's being mistaken "par une illusion d'optique

nocturne" for a torpedo craft, was by supposing that she was not "s'approchant de l'escadre" but steaming in the same direction.

Was it a Russian torpedo craft?

Yet the presence of any torpedo craft other than Russian is absolutely excluded by the evidence laid before the Commissioners. The absence of Russian torpedo craft on the other hand seems rather to have been taken for granted than established by positive evidence. Their presence is highly improbable no doubt, but not perhaps more improbable *a priori* than the presence of the Dmitri Donskoi and the Aurora, which must have been wholly unexpected by Admiral Rozhdestvensky, or he would not have fired on them. Is it quite certain that the presence even of the Aurora would have been admitted if the death of the chaplain who was wounded on the occasion had not become notorious? The economy of evidence which marked the presentation of the Russian case was one of the most remarkable features of the whole inquiry, and it is at least a plausible inference from this economy that there was a great deal of evidence present to the mind of the Russian Commissioner which was never laid before his colleagues at all. If, then, the possible, albeit unavowed, presence of Russian torpedo craft is not excluded by any of the positive evidence presented, it would furnish an hypothesis which explains more of the facts than any other yet suggested, and go far to reconcile the view taken by the Russian Commissioner with that taken by his colleagues. It is difficult to say why, if Russian torpedo craft were present, their presence should not have been acknowledged but it is not more easy to explain the persistent economies of the Russian case—economies which baffled the majority of the Commissioners and provoked comments scarcely to be distinguished from remonstrances.

If so, the incident becomes more or less intelligible.

If this hypothesis could be entertained the whole incident would be explained. Admiral Rozhdestvensky having discovered two torpedo boats opened fire on them before they were seen to be his own, and in the confusion that ensued the other ships fired on anything they could see, and continued their fire for several minutes after they ought to have realised that they were firing on unoffending fishing craft. No other hypothesis so completely vindicates the "valeur militaire" of the *personnel* of the Russian Squadron, nor can any other be suggested which does not bring the judicial findings of the Commission into somewhat sharp conflict with its diplomatic conclusion.

How came the mistake to be made?

Passing now from the judicial, diplomatic, and naval aspects of the case we have next to consider its psychological aspects. How was it that the Russian Admiral and his officers were brought into a state of mind which predisposed them to make a mistake so

deplorable in its nature, and so terrible in its consequences? That they did make a mistake is beyond all question. It was a mistake if they fired on the Aurora and Dmitri Donskoi. It was a mistake if they fired on their own torpedo craft. It was a mistake if they fired on nothing at all. It was the worst mistake of all if they fired on the fishing boats believing them to be torpedo craft. Whatever its nature then this mistake requires explanation. In the first place there were the "nombreuses informations des Agents du Gouvernement Impérial." The weight attached to this information reflects little credit on the Russian Naval Intelligence Department. Admiral Rozhdestvensky was bound of course to give due heed to information received from official or other well-authenticated sources. But the Russian Naval Intelligence Department must have known as every other Naval Intelligence Department knew, or might have known, that there were no Japanese torpedo craft in European waters. The information received by Admiral Rozhdestvensky is not stated to have come from the Russian Admiralty. It came from "agents of the Imperial Government." It would appear then that the Russian Admiralty had no such information, for if it had it is hardly conceivable that such information would not have been laid before the Commission. If it had none, the inference is that there was none to be had, and in that case unless the Russian Naval Intelligence Department is to be regarded as wholly incompetent, it might well have been expected to instruct Admiral Rozhdestvensky that the unsifted warnings of local agents were not to be taken for more than they were worth—which must have been very little indeed.

The genesis of the psychological atmosphere.

However, Admiral Rozhdestvensky did believe these warnings and made his dispositions accordingly. This was the first stage in the formation of the "psychological atmosphere," which alone accounts for the tragedy of the Dogger Bank. An attitude of expectancy had been created even before the squadron left the Skaw. It was accentuated by the adventures of the Kamchatka, herself manifestly enveloped in the same psychological atmosphere. It was brought to a state of extreme tension by the green rocket of the fishing fleet. It passed into action premature, disastrous, and unjustifiable when the appearance of the suspicious vessel liberated all that pent-up expectancy and fired a train which had been laid many hours, and perhaps several days before. The Russian officers saw what they expected to see and took action accordingly.

In such an atmosphere mistakes of the kind are probable, and have often been made.

What they saw is from this point of view immaterial. It may have been nothing at all. It may have been a torpedo craft, as they undoubtedly believed at the time, and as apparently they still believe. In that case it can only have been a Russian torpedo craft. It may

have been the Aurora, as the Commissioners seem to suggest. It may have been a fishing boat. The point is that whatever it was, whether it was anything or nothing, it was taken for a torpedo craft because that was what it was expected to be. There is nothing at all surprising in this, and there would not be much fault to find with it if the fire had not been unjustifiably opened, unjustifiably prolonged, and very inadequately controlled, with the deplorable result now known to all the world, a result which cost at least three lives —one Russian and two British—and very nearly plunged two great nations into war. There are so many officers in the British Navy who have made the same mistake that there is probably no officer of any experience in the Service who does not know how easy it is to make it, and how much more difficult it is to avoid it. In other words, the experience of British naval officers would lead them to assume, almost as a matter of course, that such a mistake was actually made by the officers of the Baltic Fleet, and at the same time to make every reasonable allowance for its being made. But to make a mistake is one thing. All men are liable to it. It is quite another thing to persist in it beyond all reason or precedent, and to make no such efforts to repair it as humanity must needs dictate, so far as they are consistent with the legitimate accomplishment of the military duties of a commander in time of war. The more ready British officers may be to make allowance for the original mistake the more fully will they concur in the censure passed by a majority of the Commission on the conduct of the Russian Admiral at subsequent stages of the proceedings.

Instances from naval manœuvres.

It will surprise many perhaps to learn that naval opinion in this country is quite ready to make all reasonable allowance for the original mistake. Yet it can be shown from the pages of the *Naval Annual* that if, with the Commissioners, we set aside the hypothesis that hostile torpedo craft were actually present at the Dogger Bank on the night of October 21, there is no possible explanation of what occurred on that occasion which cannot be paralleled by what has happened over and over again in the course of the Naval Manœuvres and other sea exercises of the British Fleet. In his evidence before the Commission Commander Keyes, an officer of large experience in the operations of torpedo craft, mentioned several recorded cases at manœuvres, including, as reported in the *Times*, "one in which a flagship leading the Mediterranean Fleet mistook a battleship for a destroyer. . . . Another case occurred at the manœuvres in 1902. The Doris observed through glasses what she thought to be a four-funnelled destroyer. The searchlight was directed on her, but failed to reveal anything. Yet in reality the boat thus taken for a destroyer

was the four-funnelled cruiser Andromeda." A very close parallel to these cases is to be found in the *Naval Annual* for 1901, p. 113, where it is stated that "on one occasion a destroyer was said to have passed, at night, six friendly battleships steaming without lights, and to have mistaken them for torpedo boats." The opposite mistake, that of taking torpedo craft for battleships or other large craft, has also been made. In the *Naval Annual* for 1900, p. 118, it is recorded that "Admiral Domvile had received circumstantial reports from the commanding officer of his destroyers that the A Fleet or a considerable portion of it had been observed during the night steering southward in the neighbourhood of Holyhead. It would seem that a flotilla of A's torpedo boats was mistaken by the officer in question for the main body of the A fleet, and reported as such to headquarters." If then the Russian officers mistook the Aurora for a torpedo craft they are not without justification in the records of British manœuvres. Even if they mistook nothing at all for a torpedo craft the same justification may be pleaded. In the *Naval Annual* for 1892, p. 58, the official report on the manœuvres of 1891 is cited for a remark of Captain, now Rear-Admiral, Durnford on "the extraordinary way people think they see torpedo boats when none are there." Even if they mistook fishing vessels for torpedo craft there is an approximate parallel to be cited. In the *Naval Annual* for 1901, p. 113, the present writer recorded the incident as follows:—

> The Minerva, scouting off the west coast of Ireland, got amongst a fleet of fishing boats off the Skelligs, on the night of July 27. Mistaking them for torpedo-boats and remaining among them for some hours, she persuaded herself that she must have been torpedoed, and loyally hoisting the "Blue Peter"—the signal for being out of action—she proceeded quietly to Milford, there to await the decision of the umpires. As no torpedo-boats were, nor, under Admiral Rawson's orders, could have been engaged, the decision was naturally given in her favour. . . . Such an incident could not, of course, happen in war, but, even in war, cruisers which mistake fishing boats for torpedo-boats are likely to meet with strange adventures.

Firing on friendly torpedo craft. The analogy between manœuvres and war not to be too closely pressed.

Lastly, if, as has been suggested above, the Russians fired on their own torpedo craft, this is an incident of no infrequent occurrence in manœuvres, British and foreign. A French incident may be cited. In the *Naval Annual* for 1894, p. 100, it is related that "the Isly came in sight and the Turco"—a *torpilleur de haute mer*—"was sent ahead to communicate with her; but not being recognised by the Furieux and the Épervier, the Turco was fired on by these vessels. About the same time a friendly torpedo-boat was fired on by the Buffle, in spite of the private signals displayed by the former." The latter instance is an extreme case, perhaps; but it shows, at any rate, how easy it is to make the mistake in question, even in circumstances which might be expected to render such a mistake almost

impossible. Manœuvres are not war, of course, nor should the analogy be pressed unduly. In manœuvres there is a definite field of operations prescribed, and within that field, and more especially at certain positions, designated beforehand by the strategic and tactical characteristics of the area, every ship on both sides knows that it must be on the look out for torpedo attack. Here the psychological atmosphere which generates a state of acute mental expectancy must needs exist, and may easily lead to mistakes which, if not excusable, are at least intelligible. But if in manœuvres an admiral were to go outside the manœuvre area to a position where the probable presence of fishing vessels in large numbers was a matter of maritime notoriety, he would hardly be entitled to plead the psychological atmosphere and its concomitant state of expectancy as a valid and sufficient excuse for any mistake that he made in consequence. Now the analogy of the Dogger Bank incident is in large measure of this latter character. The actual theatre of war was thousands of miles away. The presence of hostile torpedo craft was so improbable in the circumstances, that the suspicion of it should never have been allowed to take so firm a hold as it did on the minds of Admiral Rozhdestvensky and his officers. On the other hand, the presence of innocent fishing boats was almost a certainty. It is the duty of a naval officer who knows his business to weigh these alternative probabilities, and to draw a sound conclusion from them. It would seem that Admiral Fölkersahm did this, while Admiral Rozhdestvensky did exactly the reverse. It might be invidious to compare the "valeur militaire" of the two officers; but such a comparison could hardly be favourable to the Commander-in-Chief.

Lessons for the future.

Nevertheless, the significance of the whole story and the lessons it has to teach, belong rather to the future than to the past. Whatever may be the value of the torpedo in war—a question not relevant to the present discussion—there can be no doubt that the torpedo craft is a weapon of such tremendous and peculiar menace that it creates a psychological atmosphere of its own. In the case of Admiral Rozhdestvensky and his officers, it was able to create that atmosphere at the distance of nearly half the globe. Such a remarkabld case of action at a distance is not perhaps likely to be repeated. But when the two belligerents are separated by no greater distance than, to avoid indiscreet analogies, let us say, that which separated the Romans from the Carthaginians, the experience of the Dogger Bank is not at all unlikely to be repeated, unless its lessons are taken seriously and learnt betimes. Two things are almost certain. Innocent vessels will often be mistaken for torpedo craft, and torpedo

craft will always be fired on at sight. About the latter proposition there seems to be no sort of doubt. In the *Naval Annual* for 1896, pp. 160–1, Captain Bacon—one of the highest authorities on torpedo warfare in the Navy—wrote as follows:—

> The danger to the country is so great, if boats are allowed to rove about without definite orders, that too much stress cannot be laid on the following points. The boat . . . . is of no value compared with the ship, and therefore the onus of sinking a friendly ship should lie entirely on the boat. A boat at night is a pariah to every ship afloat . . . . A ship should always fire on any boat—whether suspected of being a friend or an enemy—that approaches her at night, since it is far better to sink a friendly boat than risk losing a ship by mistaking the identity of an enemy's boat. Since, therefore, every ship should fire on every approaching boat, no boat should take the fact of a ship firing on her as evidence that she is an enemy. The only safe way yet known of conducting an attack on a doubtful ship is for the boat to challenge the ship by a signalling method, and to allow a reasonably safe time for reply. The time occupied in approaching will ordinarily be sufficient, so that no real delay is caused to the boat. . . . A procedure such as the above cannot be too strongly insisted on if boats are to be used with safety in waters where both enemy's and friendly ships may be met with. Moreover, a torpedo attack should be a deliberate attack.

This, then, is the *rationale* of torpedo attack and defence, as formulated by one of the highest authorities on the subject in our own naval service. Captain Bacon, however, is only an individual, it may be objected, and the official theory may be different. The official theory is identical. In the *Naval Annual* for 1903, p. 170, it is related how, during manœuvres in the Mediterranean, the Implacable was attacked by a destroyer of her own side, and the official narrative of the operations is cited as remarking, "it is most unlikely that this would have happened in war, for the destroyer, which was in sight long before she attacked, would have been fired on without waiting to ascertain whether she was friend or foe." It is clear, then, that Captain Bacon's views cannot be denied the authority of official sanction. The current doctrine of torpedo attack and defence.

It may thus be taken for granted that in war all torpedo craft will be fired on at sight unless they have previously disclosed their identity. It follows that if a friendly torpedo craft is not to be spared, except on terms with which a neutral cannot comply, a neutral torpedo craft will fare still worse. A neutral torpedo craft, however, has clearly no business to be there at all. If she sights a belligerent fleet, the best thing she can do is to show it a clean pair of heels at once. Nothing on earth can save her if she once allows herself to be caught within the range of belligerent fire. In the abstract, of course, she has just as much right to use the sea as any other vessel that floats. In like manner a husbandman has every right to till his fields, if he chooses, under the fire of two contending armies But if he is killed, it is his own fault. What it implies.

So far, then, there is no great difficulty. The neutral torpedo craft must take her chance. She has no business to be there Innocent vessels.

intentionally, and if she is there by accident, she must do her best not to be there as soon as possible. But the neutral trading vessel, whether fishing-boat or larger craft, stands on quite a different footing. In the clash of war she is innocent, defenceless, and helpless, and yet experience shows that she runs a very appreciable risk of being mistaken for a torpedo craft, and, as such, of being fired on at sight. How is this to be prevented? If Dogger Bank incidents were likely to become common, the situation would be rendered intolerable to a neutral Power possessing a large mercantile marine and a navy adequate to its protection. It must be made clear to the belligerent that he cannot make with impunity such disastrous mistakes as Admiral Rozhdestvensky made at the Dogger Bank, that it is safer for him to run the risk of a not very probable torpedo attack than by making a mistake to incur the much more probable, and much more serious risk, of having the fleets of a powerful neutral added to the fleets of an adversary with whom he is already at war. In other words, the commander of a belligerent fleet or ship must show the real quality of his "valeur militaire." He must not allow his military judgment to be sophisticated by a psychological atmosphere mainly of his own creation. The right of firing on a torpedo craft at sight carries with it the correlative duty of not mistaking an innocent vessel for a torpedo craft. Such a mistake may occasionally be made in circumstances which go far to excuse it; but such circumstances must needs be very rare, and were not to be found, in the judgment of the Commission, in the situation at the Dogger Bank. "A torpedo attack," says Captain Bacon, "should be a deliberate attack." The defence against such an attack must be equally circumspect. The psychological atmosphere must be distrusted, the state of expectancy must be controlled. The sea is the common highway of peaceful commerce and industry. The belligerent commander must never forget this, nor allow himself to open fire on whatever looks like a torpedo craft on a dark night without waiting to ascertain whether what he is attacking is a furtive and insidious assailant or only a flock of defenceless and unoffending sheep, such as Quixote mistook for the troops of "the infidel, Alifanfaron of Taprobana." If he acts in this heedless fashion, he discredits his own "valeur militaire," and runs the risk of turning neutrals, wholly against their will, into his country's enemies. These are lessons which it behoves all maritime Powers to learn. It was because Admiral Rozhdestvensky had not learnt them that innocent lives were sacrificed on the Dogger Bank, and the world was brought within a hair's breadth of almost universal war.

JAMES R. THURSFIELD.

CHAPTER VII.

The Russo-Japanese Naval Campaign of 1904.

Introductory.

It is not yet possible to give a complete history of the war now being waged in the Far East. Notwithstanding the decisive character of the capture of Port Arthur the struggle is still in progress. No one can as yet say when the end will come or exactly what it will be. We may make prognostications, but they may be, and are likely to be, upset by combinations of circumstances which cannot be foreseen, and of which still less can the effect be calculated. The information coming to us from the seat of war is fragmentary, usually unofficial and without authority, and that which—such as it is—comes from one side is rarely balanced by information coming from the other. Discrepancies in reports from different sides in a campaign are not necessarily due, perhaps are not often due, to an intention of deceiving; they are occasioned by the inevitable lack of knowledge on the part of one combatant of all the proceedings of his antagonist. In the present war most of the news reaching neutrals is more than usually worthless. There has been a good deal of wise concealment on both sides. If we have no other lesson to learn from this war, we have at least that of the value of reticence given us by the Japanese. Whilst, for the reasons stated, an exhaustive narrative cannot be compiled, we may nevertheless make notes of, and comments on, the operations of the naval campaign.

Never has the lesson been more needed. Since the power of disseminating intelligence of current events by the newspaper press has attained its modern high state of development and the early transmission of it been made possible, most wars have been of a kind in which the publication of news concerning current operations was not open to serious objections. It generally informed one side of the proceedings of its own forces and practically gave little information to the other. Turks, Afghans, Egyptians, Dervishes, Kabyles, Filippinos, "Boxers," and even Boers must have derived very few hints as to the conduct of their campaigns from the statements of a "war correspondent" published in their enemies' or neutral newspapers. When two nations, each endowed with a newspaper press and habituated to the perusal of the journals of other countries, go to

war the objections to the publication of intelligence relating to an operation in progress are serious. The Japanese, and to a less degree the Russians, have shown us that concealment is possible. No officer should need to be told that it is wise.

Yet, unfinished as the present struggle is and uncertain as, to some minds, may be its issue, it has gone on long enough to make it evident that there are other lessons to be learned from it. We may see what these are; we may formulate them in such a way that they will impart instruction to us. We shall find that they confirm the lessons which war ought to have already taught us, and they may, or at least ought to, convince us that the nation which ignores or defies those lessons does so at its peril. The uncertainty of the issue of this great conflict is not to be attributed to the way in which it has been conducted. If each side adheres to its present methods the end will justify those who felt from the first that—international complications apart—Japan's success was to be looked for.

Though there has been no sustained general engagement at sea, no "pitched battle," as it is sometimes called, between fleets, there has been enough experience of fighting to enable us to draw some useful conclusions as to the relative merits of particular classes of fighting vessels and particular weapons. These conclusions will suggest themselves from time to time in the course of the following account of the naval operations.

The relative conditions

The narrative of events, however necessarily imperfect, may well be preceded by a statement of the political conditions out of which the war arose. This will enable the reader to form an intelligent comprehension of the contest as a whole, and, indeed, to understand why there was one at all. The importance to officers of making themselves acquainted with the condition and probable aims of a State with which their own country is likely to have menacing relations is too plain to need being insisted upon. Should hostilities ensue, the army and navy of the side which has studied the other's resources, readiness, and national spirit will enter into the contest far better able to appreciate the strategic problems confronting them than an army and navy limiting themselves to complacent reminiscences of past glories and assertions of confidence in their own efficiency. The present being the first great naval war waged since the publication of the *Naval Annual* began, the propriety of dealing rather fully with the political circumstances of the two belligerents will be generally recognised.

Position of Korea and Spain compared.

If the map of the eastern hemisphere be looked at we shall notice that there is some resemblance in the geographical situation of Korea to that of Spain. Both are peninsulas. Spain so

PORT ARTHUR & NEIGHBOURING WATERS.

STANFORD'S GEOGR. ESTABT., LONDON.

projects that it stands not only between the territory of France in the Mediterranean and on the Atlantic but also between the British Isles and the great areas of maritime trade in the Western Mediterranean and the Levant. Korea intervenes between the Russian province of Eastern Siberia and the Liautung district; Korea also lies between the Japanese Isles and the trading area in the Gulf of Pechili, in which the commerce of Japan had assumed a relative position, not unlike that assumed by the Levant trade of Great Britain in the latter part of the seventeenth and in the eighteenth century. The southern point of the Korean peninsula, interposing as it did between a Far Eastern Brest at Vladivostock and a Far Eastern Toulon at Port Arthur, naturally assumed in the eyes of thoughtful Japanese an importance which was attributed to the southern end of the Iberian peninsula by thoughtful Englishmen in the reigns of the Georges. The intrinsic value of Gibraltar as a naval port may have been less than that with which it has often been credited, but no one will question its negative value. Had it been in other hands than ours we should have felt the difference in more than one of the wars of the past. Independently of Gibraltar, we were accustomed to regard the attitude of Spain as of the first importance during the eighteenth century and the early part of the nineteenth. This was not simply a traditional feeling dating from the days of Spain's great and almost overwhelming naval power. The feeling continued long after Spain by herself had ceased to be a menace to our national existence. What we feared was that the resources of Spain might be absorbed or controlled by a powerful neighbour. Experience of a whole series of wars down to and including the one which followed the peace of Amiens demonstrated that our apprehensions were well founded. We can therefore understand the sensitiveness of the Japanese regarding the position and foreign relations of Korea.

Japanese attitude towards Korea.

This natural sensitiveness was made more intense by other circumstances. Korea has a good climate, considerable fertility in parts, signs of valuable undeveloped natural resources, an extensive coast-line, fisheries capable of being made prolific, and a relatively small population. The country lies so near to Japan that it seems to offer itself as a theatre for Japanese commercial and industrial enterprise. The desire to expand, indeed the necessity of expansion, had been felt in Japan of late years as much as in occidental countries; and here was an area close to her doors and almost inviting the action of her expanding energy. Sentiment also has to be taken into account. For centuries the Japanese had regarded Korea as standing in a special relation to themselves. Many of the

fundamentals of their national culture had come to them from or by way of that country. Legendary and authentic stories of Japanese prowess in war had their origin in expeditions against Korea, and the achievements therein performed were naturally contemplated with more general satisfaction by the Japanese than those by which some party amongst their own countrymen had been made to suffer. For a long period the foreign affairs of Japan were almost monopolised by her relations with Korea. Great internal political changes left the Japanese attitude towards their neighbour unaffected. Not many years after the Restoration, as it is called, Japan made a treaty with Korea opening the latter to the commerce of other nations. This persistence of the Japanese attitude deserves to be dwelt upon. Failure to attach the right importance to it has been one of the principal causes of the present war. Even had war been foreseen and allowed for, recognition of Japan's attitude as regards Korea would have greatly helped the former's opponent to devise strategical plans appropriate to the case.

Russian expansion.

That Russia was urged by an irresistible desire to expand is one of the commonplaces of recent history. Her expansion has usually taken the form of occupation of territory on her frequently advancing frontiers, and it has been common to apply to it the epithet "political," as though to show that it is not commercial or industrial. Commercial and industrial considerations have, nevertheless, been at the bottom of it just as much as political. The method of expanding, not its ultimate object, was what got it its usual name. The ultimate object has been to secure an increase of territory, within the limits of which Russian trade and industry can be made supreme by administrative regulation. We can see at once how opposed this is to the expansion desired by Japan. It was certain that when the two methods met, as they were bound to do, the collision would issue in a violent explosion. It was not difficult to see where they would meet. Had a powerful independent state lain between it and Korea, the Japanese might have seen the Russian occupation of Manchuria unmoved, or, at any rate, with only such anxiety as would have been insufficient to lead them into war. They believed that, the absorption of Manchuria by Russia having been practically effected, the Yalu River would not offer an obstacle to a further advance, and that Korea's turn to be absorbed also would soon come. The well-known wishes of Russia for an ice-free port, which seem reasonable to everyone not afraid that his own country will suffer by their fulfilment, had also to be taken into account. An ice-free port on an inland sea, which the Gulf of Pechili to a great extent is, was not expected to suffice, or, at any rate, to be thought as satisfactory as a Korean harbour.

History of events.

The acts of both parties indicated what was to come. The history of them goes farther back than is often thought. In the eighteenth century Russians from Kamchatka gave signs of intending to settle in the Kurile Islands. In 1798 another Russian movement induced the Japanese to make a formal attempt to have the boundary between their territory and the Russian settled. In 1806 an expedition was sent against the Japanese settlements in the Island of Yezo, now generally called Hokkaido. In the following year there was serious fighting, and the Japanese clans of Namba and Tsugaru suffered severely. In 1851 Captain Nevelsky hoisted the Russian flag at the mouth of the Amur. A little more than fifty years ago, when Japan was first being opened to foreign intercourse, Russian authority was established in the northern part of Sakhalin, which the Japanese considered their own. Two years later the Russian territory was extended to the northern frontier of Korea. In 1861 it was believed that an attempt had been made by Russians to annex Tsushima, an outlying province of Japan. In 1875 Russia obtained possession of the whole of Sakhalin, Japan's sovereignty over the Kuriles being allowed in return. By 1892 the design of connecting the territory on the Pacific coast of Asia with European Russia by a great trans-continental railway was seen to be a serious project, and Japan understood that there was no time to be lost.

China-Japan war, 1894.

The immediate causes of the war between China and Japan in 1894 were of comparatively small importance. Japan's reason for embarking in it was the necessity of securing her position as regards Korea before it was too late. In November, 1894, she took Port Arthur. By the Treaty of Shimonoseki the Liautung Peninsula, in which Port Arthur lies, was ceded to her by China. Russia, France, and Germany combined to force Japan to renounce the ceded territory. The renunciation was demanded on the plea of the necessity of maintaining China's territorial integrity. Germany, however, seized Kiao-chow, and Russia induced the Chinese to hand over to her the territory from which she and her associates had expelled the Japanese. That the matter would not be allowed to end here was certain. Russia took steps to secure her hold on Manchuria, through which the great railway was to run to the Liautung ports, and increased her forces in the Far East. In taking these steps she was much assisted by the disorganisation of China consequent on the "Boxer" disturbances of 1900. Japan, in the meantime, had not been idle, but had been augmenting and improving her army and navy. She needed insurance in some form against the risk of being again obliged to confront a coalition like that which expelled her from

Port Arthur. This insurance was provided by the Anglo-Japanese treaty of alliance concluded in 1902.

Events leading to war.

During the "Boxer" disturbances Russia had come into virtual possession of Manchuria. She continued to hold it after the pacification of China. A treaty of evacuation, believed to be satisfactory to Japan and to her ally, Great Britain, was made between Russia and China, and was partially carried into effect, when suddenly the evacuation was stopped, and some places which had been given up were re-occupied. This and the action of the Russians on the southern side of the Yalu, which she regarded as encroachments on Korean territory, induced Japan to move. The Russian Government was informed of her desire to open negotiations. In August, 1903, the first draft of the Japanese proposals was despatched to St. Petersburg. On the same day the Russian Viceroyalty of the Far East was created, and Admiral Alexeieff, hitherto Governor-General, was appointed Viceroy. It is unnecessary to narrate in detail the course of the negotiations between the two Governments. They lasted till the end of the year. On December 21 Japan presented her "last amendments," and to these Russia replied on January 6, 1904, Throughout the negotiations Japan had asked for, and Russia had refused to give, a solemnly formulated engagement to respect the territorial integrity of China, which, of course, involved the abandonment by Russia of Manchuria. On January 27 the Japanese Minister in St. Petersburg learnt that it had been decided by the Russian Government not to yield on the Manchurian question. War then became inevitable.

Comparison of resources.

To observers who did not attempt to go beneath the surface of things, the disparity between the two nations in force and resources was immense. The population of the Russian Empire is about 140,000,000; the population of Japan is 44,260,000. Whilst the Russian annual revenue was £218,676,000, the Japanese was £25,518,000. Such being the figures, the superiority of Russia might seem overwhelming. The figures, however, ought not to be taken absolutely; they must be considered relatively to real conditions. The population of Japan is, perhaps, the most homogeneous in the world. Even differences in the dialects of provinces at the opposite ends of the Empire are practically too insignificant to arrest the attention of any but philologists. In Russia, on the contrary, there is a great variety of races, languages, and religions. Some 30,000,000 people belong to disaffected races, whose subjection is maintained only by force or the show of it. Some 95,000,000 belong to the Orthodox faith, and may be regarded as real Russians; but a portion of these would be neutralised, because many of them have to be

looked to to ensure the loyalty or restrain the disaffection of the 30,000,000 above-mentioned. Therefore, so far from having an effective population more than three times the size of the population of Japan, Russia outnumbers her rival by about 75 per cent. In Japan there are more than 22,250,000 males, and consequently some 10,000,000 fighting men. Japan is about 48 hours' distance from Manchuria; Russia, by the Trans-Siberian Railway, is twelve times as far; by sea is twenty-five times as far. The prospect of the Japanese being outnumbered in the contested province was, therefore, remote. Though two generations have not passed since Japan was opened to the commerce of the world, the value of Japan's exports per head of population exceeds that of Russia's in the proportion of 11·6 to 11·4. The absolute difference is small, but viewed in connection with the true conditions it is great. It was claimed for Russia that her financial position at the beginning of the present war gave her a distinct advantage over Japan. There was a considerable sum in gold at the disposal of the Russian Treasury, and the Bank of Russia's stock of gold was said to be equal to £100,000,000, whilst that of the Bank of Japan was only £12,000,000. Yet the former's note issue was only three times more than the latter's.

Relative naval strength.

The insular character of Japan made it certain from the first that the war would depend upon the command of the sea. That this had been foreseen by Russia was evident from the manner in which she continued, even during the negotiations, to reinforce her Fleet in Far-Eastern waters. It is important, therefore, to examine the respective naval resources of the two Powers. In 1903 the aggregate expenditure of Russia on her naval forces was £12,349,567. In Japan the aggregate naval expenditure for the year ended March 31, 1904, was £2,534,904. Political conditions compelled Russia to keep many ships in the Black Sea and the Baltic. Nevertheless, even if these be counted, her whole force was not superior to the Japanese in anything like the proportion that her naval expenditure was to that of Japan. The Japanese Navy being as regards nearly every item of equipment purely exotic, the necessary cost of its material must have been higher. Therefore, the ability of Japan to maintain a respectable Fleet at considerably less cost than that at which her rival maintained an equivalent part of the total force went a long way to prove the superior efficiency of her naval administration. Both absolutely and proportionately she disposed of a larger maritime population than Russia, the aggregate tonnage of the latter's mercantile marine being 678,954 against 979,423 in Japan, counting in the latter case mercantile vessels of foreign type only. Fishing craft and small coasters of native type employed in Japan a very large number of

men accustomed to navigate especially stormy waters. Distance from her principal ports justified Russia in maintaining two naval yards in the Far East where she had no private industrial establishment of the kind. The yard at Vladivostock had a fine dry-dock in which in the early autumn of 1903 six separate battleships were docked in fifteen days. The other yard, at Port Arthur, was on the whole less efficient, and in 1903 its dry dock could not take in a battleship, though it was being enlarged to permit of this being done. This work, however, was not finished when the war began. Japan has four great naval yards, at two of which—Yokosuka and Kuré—first-class battleships could be docked. At a third—Sasebo—a dry dock fully as large was nearly completed; and at the fourth—Maizaru—one on the same scale was being constructed. There were also four private ship-building and ship-repairing establishments in Japan of a high class in size and equipment. The facilities for repairing and docking cruisers in Japanese government and private establishments combined were considerable.

Advantages of Japanese position.

From what has been stated above it can be seen, taking into account her relatively much closer proximity to what was to be the theatre of war, that Japan was far from being hopelessly inferior in strength and resources to her great antagonist. Her strength was greatly augmented by the spirit of her people; and this has remained so notwithstanding that she has found opposed to the devoted and unsurpassed gallantry of her seamen and soldiers an enduring fortitude, not less heroic though less illumined by intelligence. Both Powers had to draw a large part of their naval supplies from distant countries. In this respect Japan was in a better position than her rival; as most of the food required by her forces and all the coal used by her auxiliary vessels and transports were produced in the country. This and the restricted dockyard accommodation put a limit on the amount of naval force which Russia could or can profitably employ in the Far East. The limit is the sooner reached because of her want of intermediate ports of supply and refit between the primary bases in European Russia and Far-Eastern waters. This acted as an indirect reinforcement to the Japanese Fleet, as was perceived as soon as neutral ports situated between Europe and the Yellow Sea became closed to both belligerents.

Relative discipline and efficiency.

There is no need to speak at length of the discipline and general efficiency of either of the rival navies. The account of these matters has been written in plain characters by their respective performances in the war as far as it has already gone. It may be said, however, that when negotiations were abandoned every ship in Russia's Far Eastern Fleet had been a respectable, and several had been a long

time in commission. The officers and men generally must have become pretty well known to each other. The Japanese Fleet, on the other hand, had been mobilised only in the latter part of 1903, and large portions of the crews of many ships had been on board only three or four months when the conflict began. In both navies great attention had been given to firing practice with the ship's guns. In view of the more continuous commission of their ships in general it is likely that more practice firing had been carried out by the Russians than by the Japanese; but there is some reason to believe that the former's practice firing was arranged on a system far from up-to-date. Admirable economy in administration did not induce in the Japanese Navy any tendency to stint necessary supplies; whilst for every article wanted on board ship the Russians were as well off as the most profusely supplied navies. I wish to emphasise this, which is based on personal observation, because certain writers have adopted the unworthy course of attributing to the Russian naval officers in their misfortunes a habit of impairing the equipment of their ships by corruptly diverting to their own pockets the money intended to purchase it.

THE TWO FLEETS.

IN the early part of February, 1904, the Russian naval force in Far Eastern waters consisted of the following vessels stationed as mentioned:—

AT PORT ARTHUR.

(The Russian names are spelled as in the NAVAL ANNUAL for 1904, from which also the displacement and date of completion are taken.)

Class.	Names.	Displacement.	Completed.	Speed.	Armament (Light and Machine Guns omitted).	Torpedo Tubes.	Crew.
		tons.		knots.			
Battleship	Cesarevitch	12,912	1902	18·5	**4** 12-in., **12** 6-in.	4	780
"	Retvizan	12,700	1902	18·0	**4** 12-in., **12** 6-in.	6	738
"	Pobieda	12,674	1901	18·0	**4** 10-in., **11** 6-in.	5	741
"	Peresviet	12,674	1901	18·6	**4** 10-in., **11** 6-in.	5	778
"	Petropavlovsk	11,354	1898	16·8	**4** 12-in., **12** 6-in.	6	642
"	Poltava	10,960	1898	16·3	**4** 12-in., **12** 6-in.	6	651
"	Sevastopol	10,960	1899	17·0	**4** 12-in., **12** 6-in.	6	651
Armoured Cruiser	Bayan	7726	1902	21·0	**2** 8-in., **8** 6-in.	2	573
Protected Cruiser	Askold	5905	1901	23·0	**12** 6-in.	4	580
"	Diana	6630	1902	20·0	**8** 6-in.	1	523
"	Pallada	6630	1902	20·0	**8** 6-in.	1	523
"	Novik	3080	1902	25·0	**6** 4·7-in.	5	336
"	Boyarin	3200	1902	22·0	**6** 4·7-in.	5	334

Class.	Names.	Displacement.	Completed.	Speed.	Armament (Light and Machine Guns omitted).	Torpedo Tubes.	Crew.
		tons.		knots.			
Destroyer	Boiki . . .	350	1901	26 0	1 3-in., 5 small Q.F. . .	2	62
,,	Burni . . .	350	1901	26·9	,, ,, . .	2	62
,,	Boevoi . . .	370	1899	28·3	,, ,, . .	3	62
,,	Bestrachni. .	350	1899	27·0	,, ,, . .	3	62
,,	Bditelni . .	350	1900	27·0	,, ,, . .	3	62
,,	Bespochtchadni	350	1900	27·0	,, ,, . .	3	62
,,	Beschumni .	350	1900	27·0	,, ,, . .	3	62
,,	Grozovoi . .	300	1902	26·0	,, ,, . .	2	57
,,	Vlastni . . .	300	1901	26·0	,, ,, . .	2	57
,,	Vnushitelni .	300	1900	27·0	,, ,, . .	2	57
,,	Vuinoslivni .	300	1901	27·4	,, ,, . .	2	57
,,	Vnimatelni .	300	1899	27·0	,, ,, . .	2	57
,,	Ratsiastchi .	240	1901	26·5	1 3-in., 3 small Q.F. . .	3	51
,,	Ratstoropny .	240	1901	26·5	,, ,, . .	3	51
,,	Riesitelini . .	240	1901	26·5	,, ,, . .	3	51
,,	Silni . . .	240	1901	26·5	,, ,, . .	3	51
,,	Serdity . . .	240	1902	26·5	,, ,, . .	3	51
,,	Smely . . .	240	1902	26·5	,, ,, . .	3	51
,,	Storosevoi . .	240	1902	26·5	,, ,, . .	3	51
,,	Steregustchi .	240	1902	26·5	,, ,, . .	3	51
,,	Skory . . .	240	1903	26·5	,, ,, . .	3	51
,,	Strashni . .	240	1903	26·5	,, ,, . .	3	51
,,	Stroini . . .	240	1903	26·5	,, ,, . .	3	51
,,	Stratni . . .	240	1903	26·5	,, ,, . .	3	51
,,	Lt. Burukoff .	280	1898	30·0	6 small Q.F.	2	57
Armoured Gun vessel	Gremiastchy .	1500	1893	15·0	1 9-in., 1 6-in., 4 3-in. .	2	188
,,	Otvazny . .	1500	1894	15·5	,, ,, ,, .	2	188
Sloops .	Djigit . . .	1456	1877	13·0	3 6-in.	1	188
,,	Gilyak . . .	963	1898	12·0	1 4·7-in., 5 3-in. . . .	1	150
,,	Razboynik . .	1329	1880	13·0	2 6-in.	1	172
,,	Zabiyaka . .	1234	1879	14·5	Light Armament only .		172
Gun vessel	Bobr . . .	950	1885	12·0	1 9-in., 1 6-in. . . .		170

NOTE.—There were in the Far Eastern waters fourteen first-class torpedo-boats —some at Port Arthur, some at Vladivostock; and seven smaller boats probably useless for war.

DETACHED FROM THE PORT ARTHUR FORCE.

Class.	Names.	Displacement.	Completed.	Speed.	Armament (Light and Machine Guns omitted).	Torpedo Tubes.	Crew.
		tons.		knots.			
AT CHEMULPHO.							
Protected Cruiser .	Varyag . .	6500	—	23·0	**12** 6-in.	6	571
Sloop . .	Korieits .	1334	1886	13·5	**2** 8-in., **1** 6-in. . .	1	179
AT PORT NEWCHWANG (YIN-KOW).							
Gun vessel	Sivootch .	950	1885	12·5	**1** 9-in., **1** 6-in. . .	—	170
AT SHANGHAI.							
Sloop . .	Mandjur .	1416	1887	14·0	**2** 8-in., **1** 6-in. . .	1	179

The Amur and Yenesei, mining transports, or vessels for carrying mines, were attached to the Port Arthur force.

The auxiliary cruisers Lena (1895) and Angara (1898), each of 10,000 tons and 19·5 knots speed, and three steamers of the Volunteer Fleet, the Voronej, Ekaterinoslav, and Kasan, were in or near the waters about to become the scene of hostilities.

The division of the Russian Fleet at Vladivostock comprised the following ships:—

Class.	Names.	Displacement.	Completed.	Speed.	Armament.	Torpedo Tubes.	Crew
		tons.		knots.			
Armoured Cruiser .	Gromoboi .	12336	1900	20·0	**4** 8-in., **16** 6-in. . .	4	878
	Rossia . .	12130	1898	20·0	**4** 8-in., **16** 6-in. . .	5	839
	Rurik . .	10923	1895	18·7	**4** 8-in., **16** 6-in., **6** 4·7-in.	4	719
Protected Cruiser .	Bogatyr . .	6645	1902	24·0	**12** 6-in.	4	580
Torpedo Boats .	Number not exactly known.						

It ought to be mentioned that a Russian reinforcement was on its way to the Far East. It was stopped, and, indeed, for some distance retraced its steps after hostilities had actually begun. Had this reinforcing squadron reached the immediate scene of operations, it would have materially affected the balance of naval power there. If it had succeeded only in approaching Far Eastern waters, it would still have imposed on the Japanese the necessity of making arrangements to meet it, and thus would have complicated the strategic problem confronting them. The Russian Squadron just spoken of comprised the Oslyabya, battleship, the rather antiquated armoured

cruiser Dmitri Donskoi, the cruiser Aurora, the smaller cruiser Almaz, and four torpedo-boat destroyers, and was under the command of Rear-Admiral Wirenius. Vice-Admiral Starck was Commander-in-Chief of the Russian Fleet in the Far East, with Rear-Admirals Baron Stackelberg—in immediate command of the cruiser division—and Prince Ukhtomsky under him. Other flag-officers held shore appointments at Vladivostock and Port Arthur, at which latter port Rear-Admiral Vithöft was Chief of the Staff.

The scene of coming operations being in or near Japanese home waters, the whole naval force of Japan was available for service when required. As ships arrived successively in the Far East to join the Russian Fleet there, Japan went on strengthening her "standing Fleet," and by the month of December, 1903, the whole Japanese Navy was in effect mobilised. The main body assembled at the port of Sasebo under the command-in-chief of Vice-Admiral Togo. The forces at the disposal of Japan were as follows:—

Class.	Names.	Displacement	Completed.	Speed.	Armament (Light and Machine Guns omitted).	Torpedo Tubes.	Crew.
		Tons.		Knots.			
Battleship	Mikasa . . .	15,200	1902	18·6	**4** 12-in., **14** 6-in.	4	836
,,	Asahi . . .	15,200	1900	18·0	**4** 12-in., **14** 6 in.	4	795
,,	Hatsuse . . .	15,000	1900	19·1	**4** 12-in., **14** 6-in.	4	795
,,	Shikishima . .	14,850	1899	18·5	**4** 12-in., **14** 6-in.	5	810
,,	Yashima. . .	12,320	1897	19·2	**4** 12-in., **10** 6-in.	5	600
,,	Fuji	12,320	1897	19·2	**4** 12-in., **10** 6-in.	5	600
,,	Chin-Yen . .	7,400	1884	14·0	**4** 12-in., **4** 6-in.	3	400
Armoured Cruiser	Idzumo . . .	9,750	1901	21·0	**4** 8-in., **14** 6-in.	4	500
,,	Iwate . . .	9,750	1901	21·8	**4** 8-in., **14** 6-in.	4	500
,,	Tokiwa . . .	9,700	1899	23·0	**4** 8-in., **12** 6-in.	5	500
,,	Asama . . .	9,700	1899	22·3	**4** 8-in., **12** 6-in.	5	580
,,	Azuma . . .	9,436	1901	20·0	**4** 8-in., **12** 6-in.	5	482
,,	Yakumo . . .	9,850	1901	20·0	**4** 8-in., **12** 6-in.	5	498
Protected Cruiser	Tsushima . .	3,420	1902	20·0	**6** 6-in.	...	...
,,	Niitaka . . .	3,420	1902	20·0	**6** 6-in.	...	...
,,	Chitose . . .	4,760	1899	22·5	**2** 8-in., **10** 4·7-in.	4	405
,,	Kasagi . . .	5,416	1898	22·5	**2** 8-in., **10** 4·7-in.	4	405
,,	Takasago . .	4,160	1898	23·0	**2** 8-in., **10** 4·7-in.	5	385
,,	Yoshino . . .	4,180	1893	23·0	**4** 6-in., **8** 4·7-in.	5	453
,,	Otawa . . .	3,000	1903	21·0	**4** 6-in., **6** 4·7 in.	...	...
,,	Suma . . .	2,657	1898	20·0	**2** 6-in., **6** 4·7 in.	2	...
,,	Akashi . . .	2,657	1897	20·0	**2** 6-in., **6** 4·7 in.	2	...
,,	Akitsushima .	3,150	1893	19·0	**4** 6-in., **6** 4·7 in.	4	407
,,	Hashidate . .	4,277	1893	17·0	**1** 12·6-in., **11** 4·7-in.	4	418
,,	Itsukushima .	4,277	1893	17·0	**1** 12·6-in., **11** 4·7-in.	4	418

Class.	Names.	Displacement	Completed.	Speed.	Armament (Light and Machine Guns omitted).	Torpedo Tubes.	Crew.
		Tons.		Knots.			
Protected Cruiser	Matsushima . .	4,277	1890	16·0	1 12·6-in., 12 4·7-in.	4	418
,,	Naniwa . . .	3,700	1886	18·7	8 6-in.	4	352
,,	Takachiho . .	3,700	1886	18·7	2 10·2, 6 6-in.	4	352
,,	Chiyoda . . .	2,450	1890	19·0	10 4·7-in.	3	306
,,	Saiyen . . .	2,264	1883	14·5	2 8·3-in., 1 6-in.	5	230
,,	Izumi . . .	2,800	rebuilt 1892	17·4	2 10-in., 6 4·7-in.	...	314
Small Cruiser	Miyako . . .	1,800	1901	20·0	2 4·7-in.	2	227
,,	Yayeyama . .	1,600	1890	20·0	3 4·7-in.	2	228
,,	Chihaya . . .	1,250	1901	21·0	2 4·7-in.	5	126
,,	Takao . . .	1,774	1889	15·0	4 6-in., 1 4·7-in.	2	223
,,	Musashi . . .	1,476	1887	13·0	2 6·7-in., 5 4·7-in.	...	230
,,	Katsuraki . .	1,476	1887	13·0	2 6·7-in., 5 4·7-in.	...	230
,,	Yamato . . .	1,476	1886	13·0	2 6·7-in., 5 4·7-in.	...	230
,,	Ten-riu . . .	1,500	1885	12·0	1 6·7-in., 1 6-in.	...	220
,,	Tsukushi . .	1,350	1883	16·5	2 10-in., 4 4·7-in.	...	190
,,	Kaimon . . .	1,345	1882	12·0	1 6·7-in., 6 4·7-in.	...	230
Torpedo Vessel	Tatsuta . . .	850	1894	21·0	2 4·7-in.	5	150
Torpedo bt. Destroyer	Harusame . .	374	1902–3	29·0	1 12-pdr., 5 6-pdrs.	2	59
,,	Hayatori . .						
,,	Murasame . .						
,,	Asagiri . . .						
,,	Asashio . . .	373	1902	31·0	,, ,,	2	59
,,	Shirakumo . .	373	1901	31·8	,, ,,	2	59
,,	Akatsuki . .	335	1901	31·3	,, ,,	2	59
,,	Kasumi . . .	335	1902	31·0	,, ,,	2	59
,,	Sazanami . .	311	1899	31·2	,, ,,	2	56
,,	Oboro . . .	311	1899	31·0	,, ,,	2	56
,,	Inadzuma . .	311	1899	31·0	,, ,,	2	56
,,	Akebono . . .	311	1899	31·2	,, ,,	2	56
,,	Ikadsuchi . .	311	1898	31·0	,, ,,	2	56
,,	Kagerou . . .	307	1899	30·5	,, ,,	2	54
,,	Usugumo . .	307	1899	30·5	,, ,,	2	54
,,	Murakumo . .	307	1898	30·1	,, ,,	2	54
,,	Shinonome . .	307	1899	30·5	,, ,,	2	54
,,	Yugiri . . .	307	1899	30·1	,, ,,	2	54
,,	Shiranui . .	307	1899	30·5	,, ,,	2	54
Torpedo boats	58 First-class .	...	...	...	...	...	...
,,	27 Second-class.	...	...	...	...	...	...

Toyohashi, mining transport; several special vessels, and old type gunboats, one telegraph cable ship; three hospital ships; one floating workshop.

The displacement, date, and speed of destroyers in some cases differ from the figures in the NAVAL ANNUAL for 1904, but they are derived from an authoritative source.

Some of the Japanese torpedo-boats were ordinarily stationed at the different naval ports—Kuré, Yokosuka, Sasebo, and Maizuru. There were three places in addition which were considered as special torpedo-boat stations, viz., Ominato, in the great Awomori Bay on the south side of Tsugaru Straits; Takeshki, in the Tsushima group in the Korean Straits; and the Pescadores, in the Formosa Channel. Japenese torpedo-boat stations.

An important reinforcement for the Japanese Navy was on its way from Europe to the Far East. Two armoured cruisers, each of 7294 tons displacement, had been built at Sestri Ponente, near Genoa, for the government of the Argentine Republic, their names being the Moreno and Rivadavia. The latter had been launched in 1902, the former in 1903. The contract for the delivery of the vessels was signed on December 31, 1903. They left Genoa on the footing of merchant vessels on January 9, 1904, and arrived on February 16, at Yokosuka, having steamed to that place direct from Singapore. They were at once taken into the Japanese Navy, and received the names of Kasuga and Nisshin. The Kasuga was armed with one 10-in. gun; two 8-in.; and fourteen 6-in.; besides light and machine guns. The Nisshin's principal armament consisted of four 8-in., and fourteen 6-in. guns. Each had a speed of 20 knots and was fitted with four torpedo tubes. Nisshin and Kasuga.

On January 30, 1904, the Japanese government made another effort to obtain from St. Petersburg a prompt answer to its representations. On the following day the Russian Minister of Foreign Affairs informed the Japanese Envoy that he appreciated fully the gravity of the present situation, and was desirous to send an answer as quickly as possible, adding reasons why there should still be delay in replying. On February 5, the government in Tokio, telegraphed to its representative in St. Petersburg that further prolongation of the situation was inadmissible, and directed him to inform the Russian Minister for Foreign Affairs that there was no alternative other than to terminate the present futile negotiations. The communication ended with the statement that the government of Japan reserved to itself the right to take such independent action as it might deem best to consolidate and defend Japan's menaced position, and protect its established rights and legitimate interests. This communication was handed to the Russian Foreign Minister at 4 p.m. on February 6. It was a plain intimation that war would begin at once. Negotiations immediately preceding the war.

On the day just mentioned (February 6, 1904), the Japanese "United Squadron," under the chief command of Vice-Admiral Togo, left Sasebo. On the following day, the squadron—now raised to the dimensions of a fleet—arrived at Mokpho, one of the bays at the The Japanese Fleet puts to sea.

South-Western corner of the Korean Peninsula, about 400 miles distant from Port Arthur, which bay it made its first flying base. A report from Port Arthur on February 2, stated that on the previous Saturday, January 30, an order had been received that the Russian ships of war should be taken through the harbour entrance, and that an "observation movement" of the naval and military forces should be carried out. The Russian Fleet consisted of seven battleships and six cruisers, exclusive of a few vessels remaining in the harbour. On the afternoon of February 3 this force steamed out to sea. A fleet of 26 vessels of all classes, believed to be the above with its destroyers, was reported off the Shantung promontory on February 4. After this it returned to Port Arthur and anchored outside. On February 8, a telegram from Vladivostock reached Port Arthur, stating that the Rurik, Gromoboi, Rossia, and Bogatyr, at the former place, had prepared for action, and had taken in full supplies. A large number of transports had been collected at Sasebo, and some of them carrying about 12,000 Japanese troops had put to sea about the same time as the Japanese Fleet. A squadron under Rear-Admiral Uriu, composed of the Asama, Naniwa, and Takachiho, accompanied the transports as a covering force. The Chiyoda was at Chemulpho, where she had been some time.

The Russian problem.

The problem confronting the Russians was mainly of a defensive kind. They had to prevent the Japanese from conveying an army across the sea and landing it on the Continent. If the Russian Fleet was able to meet the Japanese at all its best chance of success would be in adopting the offensive-defensive plan. In number of battleships the Russians were superior to the Japanese, though the size and, as far as it depended on size, the power of four of the Japanese battleships were superior. In this section of the naval force the two fleets were nearly on an equality. In cruiser force the Russians were inferior, but, taken altogether, their inferiority was not so marked as to deprive them of the hope of succeeding in a naval action. That the Japanese had collected many transports at Sasebo was notorious. That these would accompany the Japanese Fleet, or at least would look to it for protection, and thus hamper its action, was to be expected. It was also to be expected, if the main body of the Japanese Fleet were to move to a distance, that it would not do so independently of the transports, but that it would have to weaken itself by detaching a force to cover them. Notwithstanding the unsurpassed and admirable thoroughness with which the Japanese concealed their proceedings, enough information concerning them had become public property by the beginning of February, to permit an attentive observer to draw useful

inferences as to their intentions. The preparations of the Russian cruisers at Vladivostock, and the egress from Port Arthur of the rest of the Russian Fleet, indicated that a movement on the part of the Japanese was anticipated, and that the Russians were ready to meet it. An advance towards the Korean Straits would have been strategically advantageous and, even in circumstances of still unruptured diplomatic relations, would not have been more provocative than the steps actually taken. It can only be concluded that the Russians elected deliberately to adopt the purely defensive instead of the offensive-defensive plan. It is, however, to be said that there was a widely-spread conviction amongst the Russian authorities, that Japan would not dare alone to go to war with Russia. We ourselves have recently, in the Boer war, had experience of the deplorable results of allowing a conviction of the kind to dominate the minds of those in authority. The first of these deplorable results is, almost invariably, to take half measures, about the worst thing that can be done when war threatens. They are as inconvenient and nearly as costly as full measures, and the adoption of them paves the way for regrettable incidents, and perhaps serious disasters. It is only by accepting the above explanation of the Russians' attitude that we can understand the distribution of their anti-torpedo-boat force of destroyers in which they were numerically superior to the Japanese. The destroyers, even if a purely defensive method were to be adopted by the Russian Fleet, would have been best employed had they been pushed out in front of the ships at anchor off the mouth of Port Arthur. Instead of that the destroyers lay on the inner side of the ships. A division had, indeed, been detached, but apparently only to Dalny, where, if acting at all, it could act only defensively.

The Japanese problem.

The problem before the Japanese was more complicated. They had to meet a hostile fleet, and also to pass a great army across the sea. In addition to this, the military, as distinguished from the naval, objective was not single or simple. Korea was to be occupied and kept clear of foreign troops. Port Arthur was to be isolated with a view to its future reduction. The Russian Army was to be pushed back beyond the frontier of Manchuria. As long as the Russian Fleet retained its efficiency, it would be impossible for the Japanese to gain their military objective. Consequently, the first step which they had to take was to impose inactivity on the Russian Fleet, and reduce it to such a state that it would not act efficiently as a body until there had been time enough for the Japanese Army to be transported to the continent, and be placed so as to threaten Port Arthur, the base on which the fleet rested. Moreover, the superiority of the Japanese Fleet over the Russian Far Eastern Fleet, which was

slight absolutely, was merely local. The Navy of Japan, as a whole, was not as strong as the Navy of Russia. Consequently, the probability of the latter being reinforced from Europe had to be allowed for and constantly borne in mind. This made it necessary for the Japanese Fleet to keep itself in a state of efficiency to meet any fresh force that might be sent from Europe to the Far East. Japan had before her the most difficult of all tasks. She had to combine, in both her naval strategy and her naval tactics, circumspection and daring, caution and energetic enterprise. The enemy's fleet had to be rendered inoffensive or immobile, but the capital ships of Japan, which could not be replaced if lost, had to be saved for future emergencies. From this it followed that the Japanese Fleet had to be placed where it was not likely that it would be taken at a disadvantage, and when in contact with its opponent—in other words when tactics came into operation—it had to abstain from pressing its attacks close home, so as to avoid the risk of excessive damage to its ships, a risk which even a victorious fleet in a hard-fought action cannot expect to escape altogether. This called for a display of moral qualities of a high order—resolution in carrying out plans, self-restraint in forbearing to push a promising operation far enough to gain a temporary success at the risk of ultimate inability to ward off disaster.

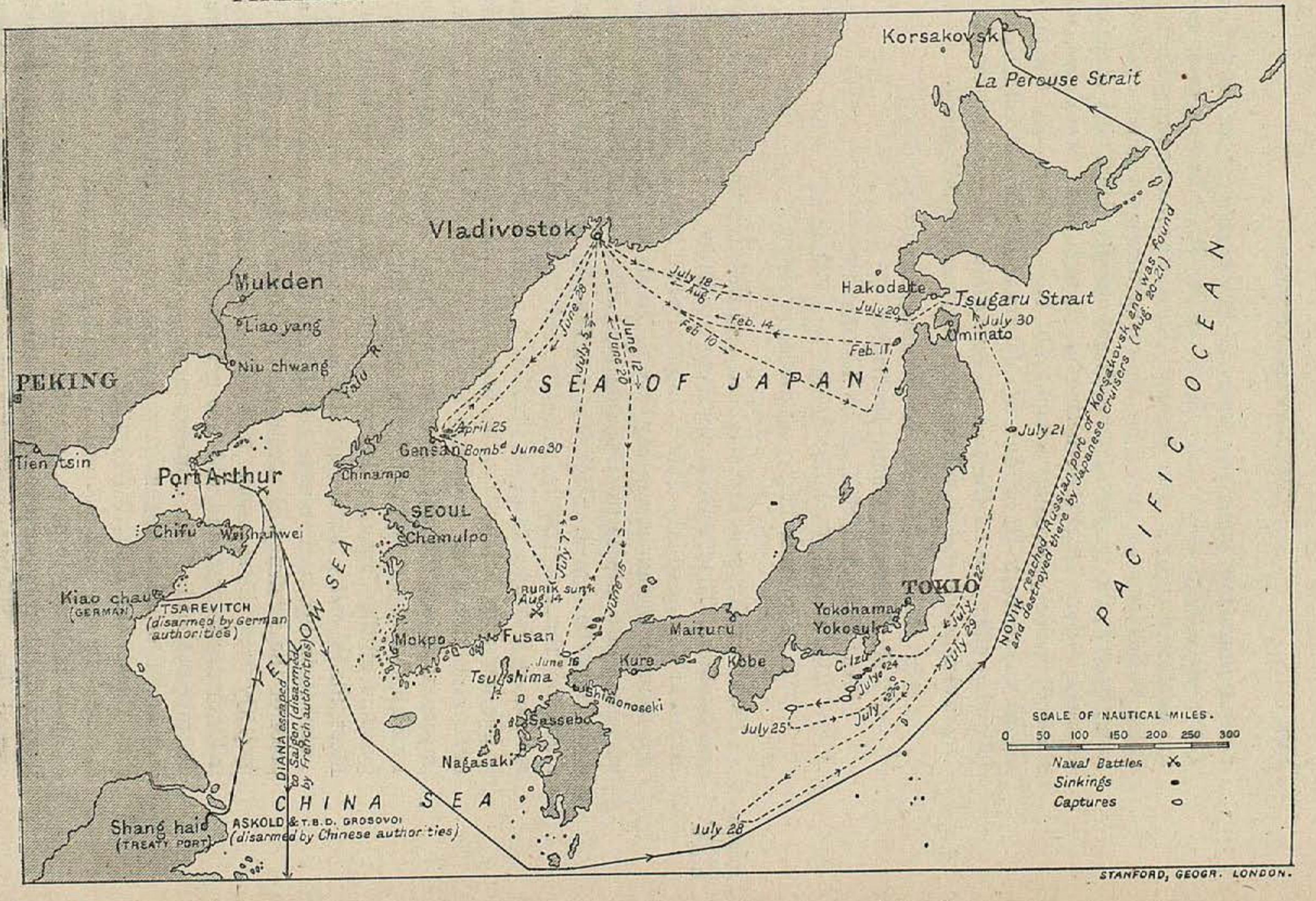
II.—Operations of the Campaign.

The initial operations off Port Arthur.

It has been seen how the respective naval forces of Japan and Russia in the Far East were placed in the first week of February. There was a Russian squadron of four cruisers at Vladivostock. The main body of the Russian Fleet was at Port Arthur, all the capital ships and most of the others being at anchor just outside the port. Its destroyers, except a few which had gone to Dalny, 36 miles off, or which cruised between that place and Port Arthur, were lying inside the anchored ships. Admiral Togo, who, as already observed, had left Sasebo with the Japanese Fleet on February 6, was at or near Mokpho in the south-western part of Korea on the 7th. At noon on that day the Akashi joined Admiral Togo, and reported that the main force of the Russians was lying outside Port Arthur, and that the Varyag and Korieits were at Chemulpho. At 4 p.m. Rear-Admiral Uriu, with his cruisers, the "fourth squadron," was sent to Chemulpho to cover the landing of troops from the transports, of which four accompanied him. According to Russian accounts, he was also accompanied as far as a point about three miles from Round Island by eight torpedo-boats.

Admiral Togo, with the main body, proceeded in the direction of

THEATRE OF THE NAVAL CAMPAIGN OF 1904.



Port Arthur, and spent the night of February 7 in reconnoitring. There was a high sea, but by dawn on the 8th it became calm, and the weather was fine. The Japanese Fleet continued to move nearer Port Arthur, and at sunset on February 8 was probably some 60 miles from it, though the distance is not stated. Here five divisions of torpedo-boat destroyers, acting as torpedo-boats, were sent off, three divisions proceeding straight for Port Arthur. At 6 p.m. a signal was made to them from the Japanese flagship Mikasa to the following effect, "Sink the enemy's squadron. Success to you all!" The divisions are stated to have been composed as follows:—

1st. Asashio, Kasumi, Shirakumo, Akatsuki.
2nd. Ikadsuchi, Oboro, Inadzuma.
3rd. Usugumo, Shinonome, Sazanami.
4th. Asagiri, Hayatori, Murakumo, Shiranui.
5th. Akebono, Yugiri, Kagerou, Harusame.

Torpedo flotilla attack.

Each division was in line ahead, and the divisions were astern of one another. The speed at first was moderate, but was eventually increased for apparently a short interval to 22 knots. The intention was to reach the anchorage of the Russian ships about 11 p.m. The moon had just entered the last quarter, and had set at the moment of delivering the attack. The 4th and 5th divisions went to Dalny, found no Russian vessels, and returned to the rendezvous. The remaining divisions, forming practically a single line ahead, sighted a Russian ship, believed to be the Askold, which was lying rather farther out than her consorts; but the Japanese, desiring a more important object, did not try to torpedo her. About this time three Russian destroyers, apparently returning from Dalny, were sighted by some of the Japanese destroyers about the centre of their line. Most likely, owing to the greater care with which the latter concealed their lights, they were not sighted by the Russians; but, as a proof of the efficiency of "destroyer" defence against torpedo craft if properly used, the sternmost half of the Japanese line altered course individually to port, and did not get into action. The four or five destroyers ahead of the centre went on, and shortly before midnight discharged torpedoes at the Russian ships, from which they estimated that they were distant 600 yards. The difficulty of estimating distances in the dark is great and well known, and in this case the estimate is likely to be under rather than over the true figure. The Russians, taken by surprise, quickly turned on their searchlights and opened fire. This was ineffective, as no Japanese were hit. In his official report Admiral Togo stated: "At midnight on the 8th, our torpedo-boat destroyers attacked the enemy at Port Arthur. At that

time most of the enemy's ships were outside the harbour. I assert that at least one vessel of the Poltava type, the cruiser Askold, and two other ships were torpedoed by our destroyers." Of course, it was not easy to identify the hostile ships at night, but the official Russian report announced that more important craft than those mentioned by Admiral Togo had suffered. The Viceroy, Admiral Alexieff, telegraphed to the Emperor of Russia: "About midnight on January 26 and 27 [O.S., February 8 and 9], Japanese torpedo-boats delivered a sudden attack on the squadron lying in the Chinese Roads at Port Arthur, the battleships Retvizan and Cesarevitch being injured." In a later telegram he reported that "none of the three damaged ships was sunk. The Cesarevitch is damaged in her steering compartment, the Retvizan in the part containing the pumping apparatus below the water-line. The damage to the Pallada is amidships, not far from the engines." Two Russian seamen were killed, five drowned, and eight wounded. Two unexploded torpedoes were found after the attack was over. Each of the Japanese destroyers which actually attacked is reported to have discharged two torpedoes.

Comments on the attack.

It was supposed by some people that the low temperature at the time of this operation had affected the running of the torpedoes discharged, and that, consequently, the attack was less effective than it would have been but for this. How little ground there is for this supposition—which, if correct, would tell against the torpedo as a weapon by showing that it was too delicate to be depended on in not uncommon conditions of climate—is proved by the fact that at least three torpedoes did explode and did injure the ships against which they were directed. The two others that were recovered unexploded were said by the Russians to have their safety-pins in place. This, however, has been denied by the other side. What is certain is that these two torpedoes did not explode. There is reason to believe that the whole number discharged was not large, being probably under a dozen.

No torpedo attack could be delivered in conditions more favourable to the weapon. The Japanese officers and men have shown a capacity for carrying out attacks of the kind which cannot be surpassed. Where they may fail in them it is not likely that any one else would succeed. The enemy to be assailed at Port Arthur was in an exposed position, had taken no special precautions against an attack, and, indeed, was not expecting one. His whereabouts was accurately known, and there was no necessity to send scouts in advance of the attacking torpedo flotilla to find out where he was. The weather was all that attacking torpedo craft could desire, and the absence of

moonlight, which was not needed to enable the officers of the flotilla to find their object, for they knew its whereabouts already, ensured that invisibility which is the chief defence of such craft and an important aid to their essential tactics of surprise. In these circumstances it would not have been unreasonable to anticipate the destruction of several of the Russian ships. No ship, however, was destroyed; and, even with the relatively restricted resources of Port Arthur, those that were injured were put in a state to take the sea again and engage in battle.

As has been seen, there were two expeditions by torpedo craft—one against the Port Arthur ships, the other against a couple of Russian vessels understood to be at Dalny or Talien-wan. The second expedition failed completely. It is worth while to consider the reason of its failure. The reason was that the attacking torpedo craft did not know the exact position of their enemy and failed to find him. Their experience ought to be contrasted with that of the divisions of the flotilla at Port Arthur, and the difference between the two will bring out clearly one of the limitations inherent in torpedo-craft tactics, viz., the necessity of ascertaining the whereabouts of the object before delivering an attack. Another inherent limitation was emphasised by the failure of the rear portion of the divisions approaching Port Arthur to "get home" because their proceedings had been disconcerted by the mere appearance of three hostile destroyers. It is justifiable to infer from the latter incident that had all or most of the Russian destroyers been employed, as they might have been, the chances left to the Japanese flotilla of succeeding even as far as it did would have been greatly diminished.

Essentials of torpedo tactics.

The lesson to be learned from the operations on the night of February 8, 1904, is that it is necessary to understand that torpedo-boat tactics ought to be of a much more elaborate character than that generally assigned to them. Except in circumstances so unusual and so little likely to recur as those observable at Port Arthur on the night in question, a scheme of attack which merely contemplates the rush of unsupported torpedo craft against an enemy's ships will have but a poor chance of success. The advance of a torpedo flotilla must be preceded by scouting, which will ascertain the enemy's exact whereabouts, and the flotilla must be attended by craft of some kind to deal with destroyers or *contre torpilleurs* likely to disconcert or frustrate its action. If we add to this the necessity of favourable weather and the importance of maintaining invisibility at least till within safe torpedo range, we can see how many things have to be taken into account, and how many elements must enter into the composition of an attacking

torpedo force if its success is to be made likely. We must not leave out of sight the conditions under which a fleet allowing itself to depend on the action of its torpedo craft would have to work. Can a fleet so conditioned maintain its mobility? Circumstances of weather, of light, of distance, of observation, which the fleet by itself might safely disregard, would become factors of prime importance if it were accompanied by its torpedo flotilla. If the flotilla were to act independently its operations, to be effective, must bring it relatively close to the enemy's ships; but that is the station which the fleet itself would have to take up. It seems safe to conclude that the cases in which a torpedo flotilla can be used with a good prospect of succeeding are exceptional, and that it would be imprudent to base a scheme of strategy on the possibility of its saving a fleet from the necessity of fighting the fleet of the enemy. Torpedo craft working from home stations within reach of the objects to be attacked must be reckoned with; but the experience at Port Arthur, above narrated, indicates the method by which the action of these craft may be impeded, if not altogether brought to naught.

General attack by Japanese.

On the morning of February 9 Vice-Admiral Togo sent a squadron of three cruisers towards Port Arthur to reconnoitre. One of these, the Chitose, met a neutral steamer on her way from the port to Chefoo, and learnt from her that at least two Russian ships had been damaged by torpedoes in the night before. On receiving a report of this Admiral Togo decided to make a general attack on the enemy with his whole fleet, which was counted by the Russians as containing fifteen ships, probably five battleships, afterwards increased to six, also six cruisers, and three smaller vessels. The Japanese Fleet approached Port Arthur in single column line ahead. About 11 a.m. several Russian men-of-war were observed coming out, and some twenty minutes later the Japanese opened fire on them and on the forts at a range of 8000 yards, which is said to have been maintained throughout. It is probable, however, that this applies to the range from ship to ship, and that shells were fired at the forts at a range of 10,000 yards or more, as several shells fell in Port Arthur itself at spots not much less than 12,000 yards from the guns which discharged them. No guns of less calibre than 8 in. were fired by the Japanese. The object of the attack was to complete the work done by the torpedo craft, and destroy the Russian ships that those craft had injured. This was not effected. The injured ships were withdrawn into the harbour.

It was believed in the Japanese Fleet that not a single shot from any Russian ship hit a Japanese ship. All the damage done by the Russians, and it was not considerable, was done by the guns of the

forts. The Japanese fire was much more effective. The battleship Poltava and the cruisers Diana, Askold and Novik were each damaged. After the action had lasted nearly an hour the Russians, except the Novik, returned to port. The last-named cruiser, commanded by Captain von Essen, approached the Japanese line and kept up from her rather light armament a sharp fire upon it for several minutes, but was driven off by the greatly superior fire of her opponents. In general there were four Japanese ships firing at a time, and each fired for about ten minutes. It seemed at one time possible to cut off several of the Russian ships. To do this would have brought the Japanese Fleet under the fire of both Russian ships and forts at comparatively close range. Such tactics would in any case have been of very doubtful merit. As the possibility of the Russian Fleet being reinforced from Europe had to be allowed for, the tactics alluded to would, in the particular circumstances, have been fundamentally bad. If it were to adopt them the Japanese Fleet could hardly hope, even if victorious, to escape without a serious diminution of its fighting efficiency. This would have resulted, in all probability, in handing over to the reinforced Russians the command of the sea, and in rendering it impossible for Japan to succeed in the war.

Japanese losses.

Admiral Togo had been expressly ordered by his Government not to risk his battleships unnecessarily, as they could not be replaced during the war. With a forbearance indicating great power of self-restraint, and entitling him to the lasting gratitude of his countrymen, he drew off his fleet just as no small portion of his enemy's seemed almost within his grasp. The Japanese Fleet had not suffered severely. Three officers and one seaman had been killed; eleven officers and forty-six seamen had been wounded, six of the latter mortally.* Twenty-three of the wounds were reported as slight. The main fighting-top of the Mikasa, Admiral Togo's flagship, was much damaged by a heavy Russian shell, and several officers were wounded by the fragments. The Asahi was not touched. The Fuji, which ship had fourteen killed and wounded, was struck more than once, but was not materially injured. The Hatsuse had sixteen killed and wounded, and the Admiral's cabin was wrecked by a shell. The Shikishima had sixteen killed and wounded and had one of her funnels damaged, besides other injuries. It is remarkable that the armoured cruisers, which must have been as well within range of the Russian guns as the battleships, because three of them were hit, suffered less than the battleships. The

* The first return made the total number killed and wounded fifty-four, which was increased to seventy-two in a later return.

ward-room of the Iwate was wrecked by a shell and the ship was set on fire. The Yakumo and Tokiwa were both hit, or rather touched, by Russian projectiles, but were not injured. There was one wounded in the Yakumo and two were wounded in the Tokiwa. The protected cruiser Yoshino had one wounded. The damage to the Japanese ships was in no case sufficient to render them unfit for action, and in a few days it was repaired. Few, if any, shot struck the Japanese ships on their armour, and, as far as they were concerned, its protective merits were not tested.

The Russian Fleet lost nine men killed, two officers and fifty-one men wounded. In the batteries on shore one man was killed and three were wounded. Some Japanese projectiles fell in the harbour and at least one fell close to the dockyard. The damage done to the batteries was insignificant. The Pobieda is said to have been hit fifteen times, mostly on her armour. The Poltava was hit by a heavy Japanese shell near one of her hawse-pipes and seriously damaged. After this she seems to have taken little part in the battle, and it would look as if it were possible to put a battleship out of action without touching her armour. The Petropavlovsk was hit on her armour, near the base of one of her funnels, and was not damaged. The Japanese towards the close of the affair are said to have concentrated their fire on the protected or unarmoured cruisers, Diana, Askold and Novik. The Askold had a large hole made in her plating near the water-line and was set on fire, her experience being similar to that of the armoured Iwate. The Askold's main-topmast was shot away and her aftermost funnel was injured. The Diana was hit near the water-line. The Novik, which for a short time bore the concentrated fire of several Japanese ships, was hit several times, and her steering gear was damaged. Nevertheless she managed to get into port, and her injuries, as well as those of her consorts, were repaired in a comparatively short time.

Damage to Russian ships.

The general result of Admiral Togo's operations—the night torpedo attack and the cannonade of the Russian ships and batteries on the next day—was to ensure the at least temporary immobility of the Port Arthur fleet. The number of Russian ships requiring repair to make them fit for battle was great enough to render the remainder insufficient to face, with much hope of success, the but little damaged Japanese Fleet. When the action of February 9, outside Port Arthur, ceased, it was certain that, as far as regards capital ships at any rate, the transport of the army from Japan to Korea might go on without fear of molestation. There were still the large force of destroyers at Port Arthur and the four cruisers at Vladivostock. A squadron was detached to look after the latter.

General result of these operations.

As regards the former, it is to be said that the difficulties in the way of their making an effective dash at the Japanese fleet of transports were practically insuperable. In the first place, the Japanese had taken such efficient measures to prevent the transmission of intelligence concerning their movements that the Russians could not have known that the Japanese troops were to be landed on the western coast of Korea instead of at Fusan, as was generally expected. That port is over 500 miles from Port Arthur, and though that figure would not be beyond the striking distance of destroyers able to make an unobstructed run to it and home again, it would be more than they could make reasonably certain of accomplishing when a victorious fleet, comprising a large force of cruisers, was lying across their path. An even greater obstacle in the way of their success was the ignorance of their commanders of the whereabouts of the Japanese transports, for even if it were assumed that these would go direct from Sasebo to Fusan, the hour, or for the matter of that the day, of their starting was quite unknown. To have given the Russian destroyers a fair hope of disconcerting the transport of the Japanese Army, they should have been accompanied—as has been intimated already—by vessels meant to search for and find the objects to be attacked, and by others to protect the destroyers themselves from being assailed by the enemy. No vessels in existence could be better suited for these services than some of the Russian cruisers, but the Askold and Novik, the most suitable of them, were for the time *hors de combat*, and without them there did not remain enough efficient and appropriate cruisers for the purpose.

Lessons in use of destroyers.

This is another example of the necessity of elaborate preparation and a comprehensive and properly constituted force if a torpedo attack is to be undertaken—unless in circumstances so favourable to it as to be too rare to be often met with. Consideration of this condition ought to lead us to inquire as to the extent to which it is desirable to admit torpedo tactics into a general strategic plan, instead of restricting them to minor operations of a special character not usually practicable. It is desirable to avoid entrance into a vicious circle, in which the necessity of defending and re-defending that which of its very nature ought to rely on its powers of offence, and of providing accessories for the torpedo-craft, would compel us to construct a force, only to be employed on rare occasions, if at all. This force would have to be so considerable in numbers and cost that the main body of the Fleet capable of acting in the general operations of a war would be nearly sure to have its efficiency diminished in more than the direct proportion of the numbers of the special vessels designed for contingencies not likely to happen often. This may be

stated in another and shorter form by saying that no craft should be included in a navy unless her strategic value is beyond doubt. It may have been that the Russian naval officers regarded their destroyers as a relatively immobile defence force intended to ward off attacks made by the Japanese Fleet, and therefore a force which was not to be sent to any considerable distance from Port Arthur, where their own ships had taken refuge. If it were so, it would merely be another proof of the paralysing effect of making reliance on a fortified base a cardinal point of naval strategy.

The injuries to the Russian men-of-war caused by the torpedo attack in the night of February 8–9 and the fire of the Japanese ships on February 9th were repaired more expeditiously than was generally expected. A report from Tokio stated that all the Russian ships were taken into Port Arthur on February 10. The Russian Viceroy's official report was as follows:— Repairs to Russian ships.

"The Cesarevitch and Pallada were brought on February 9 into the inner harbour. The leak in the Retvizan is being temporarily stopped. The repairing of an ironclad [battleship] is a complicated business, a period for the completion of which it is hard to indicate. The Pallada and the Novik will be brought into harbour and docked in succession. In my opinion the repairs will require about a fortnight. All the other ships which took part in the action of February 9 and sustained damage were brought on February 10 into the inner harbour to empty their coal-bunkers and undergo repairs which, I hope, will be completed in three days."

On February 21 it was reported that the Novik had been repaired and had left the dock. The Pallada was completed by the middle of April. It had, apparently, not been found possible to enlarge the dock so that it might take in a battleship in time to permit the capital ships to be repaired in it and their injuries were made good by the use of coffer-dams. Both Cesarevitch and Retvizan were ready for sea by June 20.

The Japanese had for a long time previously kept a body of troops as a strong legation guard at the Korean capital, Seoul. The number of these varied, but it was usually about 400. Their officers were well acquainted with Korea, in which country they had made a campaign only ten years before. They were specially familiar with Chemulpho, where 12,000 of the 30,000 Japanese subjects in the Empire of Korea resided. The Japanese had managed to get control of the Korean telegraphic communications, and for some days before February 8, 1905, had stopped the transmission of telegrams likely to be prejudicial to their interests. In this sensible proceeding, as well as in their complete and admirable reticence, they gave a lesson Operations off Chemulpho.

to future belligerents. Besides the two Russian men-of-war, Varyag and Korieits, already mentioned as being there, H.M.S. Talbot, the French cruiser Pascal, the Italian cruiser Elba, the U.S.S. Vicksburg, and a U.S.S. hospital ship which had brought up marines as a guard for the American legation in Seoul, and also the Japanese cruiser Chiyoda, had been lying for some time at Chemulpho. Being aware that relations between his own country and Japan were strained, and having received no communication from his superiors for several days, the Russian senior officer, captain of the Varyag, decided to leave Chemulpho and go to Port Arthur. He was forbidden by the Russian minister to carry out this prudent intention. If nothing else can, the result of this prohibition, which sealed the fate of both Russian vessels, ought to show the impolicy of permitting diplomatic officials to control naval movements. In the night of February 7 the Chiyoda put to sea. The Russian captain at last obtained permission to send off the Korieits with despatches and to make inquiries. Port Arthur is rather less than 400 miles from Chemulpho, and a destroyer going moderately fast could have easily brought instructions to the isolated Russian vessels at the latter place in twenty-four hours, and in thirty-six hours more they might, with the destroyer, have both joined the main body of their fleet. The omission of the naval authorities at Port Arthur to recall their outlying vessels as a mere matter of ordinary precaution on relations becoming strained may have been due to the strongly held Russian belief that Japan would not dare to go to war. It is, however, only fair to those authorities to say that impolitic dispersal of men-of-war in distant seas is usually adopted in deference to the demands of diplomatists and consuls whose ignorance of naval strategic requirements is profound. It is not every admiral who has sufficient strength of character to resist demands of the kind.

Movements of Korieits.

On the afternoon of February 8, too late as is now known, to have got into Port Arthur, the Korieits started from Chemulpho. When some three miles out she encountered a Japanese squadron (Rear-Admiral Uriu's) of cruisers and torpedo-boats. The officers of the Korieits state that, so little did they expect war, that their ship saluted the Japanese admiral's flag. The salute was not returned, and the flagship Asama placed herself so as to bar any farther advance of the Korieits. On this the latter cleared for action. Four torpedo-boats now approached as though about to attack her. They discharged, according to the Russians, three torpedoes at her. Two went wide; one ran straight, but dived beneath her. The Korieits admittedly fired two shots, the first gun-shots fired in the war. There are two Russian statements concerning this firing. One is

that no shot was fired by the Korieits until the second Japanese torpedo had been discharged at her. The other is that both shots were fired by a man who misunderstood an order. As the statements are practically irreconcilable, the Japanese contention that the Korieits —which it is admitted cleared for action—was the first to fire seems well founded. The contention received negative corroboration from the absence of mention of the firing when the fact that the Japanese had discharged torpedoes in earnest was communicated to some of the neutrals at Chemulpho. The Korieits returned to the anchorage.

Proceedings inside Chemulpho.

The Chiyoda had joined Rear-Admiral Uriu's flag at daylight on February 8. At 5.30 p.m. she re-entered Chemulpho with the Takachiho and Akashi and five torpedo-boats. These boats, says a Japanese report, "took up positions all round the two Russian ships in such a way as to be able to blow them up at a moment's signal." The captain of the Varyag then pointed out to the neutral officers in port that the Japanese torpedo-boats had placed themselves in such a position that they could attack the Russian ships without damaging any of the other shipping; whereas the Russians could not fire without the greatest danger of hitting neutral vessels. The captain of H.M.S. Talbot sent to the Japanese senior officer a protest against action endangering the safety of British subjects or property, and seeing the propriety of this the Japanese engaged to make no attack on the Russians if the latter would refrain from attempts to impede the landing of the Japanese troops which had arrived at Chemulpho in the transports Tairu, Otaru, and Heijo, under convoy of the cruisers. The landing began about 8 p.m. There was no molestation by the Russians, and the work was completed shortly after midnight.

Action off Chemulpho,

Early in the morning of February 9 the captain of the Varyag received a letter from the Japanese Consul informing him, on behalf of Admiral Uriu, that the Russians would be attacked at 4 p.m. at the anchorage unless they left it before noon that day. A protest against this, signed by the British, French, and Italian captains, was sent to Admiral Uriu, but did not reach him till a few minutes before the Varyag and Korieits—which in the meantime had left the anchorage—were brought to action by the Japanese Squadron. The Russian vessels weighed anchor and started about 11.45 a.m. The Japanese Squadron, composed of the Asama, Naniwa, Chiyoda, Takachiho, Akashi, and Niitaka, which was lying in the outer waters about eight miles off, also got under way. According to Japanese reports the Russians opened fire, and it was immediately returned by the Japanese, who say that the shortest range was 4800 mètres (5250 yards), and the firing was fiercest at a distance of 5400 mètres (5900 yards). The Russians put the distance at which fire was

opened—according to them by the Asama—at 9000 metrès (9840 yards). Admiral Uriu's official telegraphic report ran as follows:

"At noon on February 9, as the Russian cruiser Varyag and the gunboat Korieits were steaming out of Chemulpho Harbour, our squadron attacked them west of Phalim Island. After a cannonade of thirty-five minutes the Russian vessels were forced to re-enter Chemulpho. At 4.30 p.m. the Korieits blew up, and subsequently the Varyag and the Russian steamer Sungari were destroyed and sunk. No casualties occurred in our squadron, and all the ships are safe, the martial spirit running high."

Russian losses.

Neutral observers, who noted the time, considered that the real action lasted between fourteen and fifteen minutes, and that during the rest of the time that the firing went on neither side was under effective fire.* No Japanese ship was injured or even, as far as can be ascertained, touched; and there were no casualties amongst the Japanese crews. The Japanese maintain that they concentrated their fire on the Varyag and disregarded the Korieits. The latter vessel was said by her officers to have been slightly touched once, but she received no damage. As the Varyag was returning to the anchorage it was noted that she was heeling to port, and twelve shot holes were counted in her hull on both sides. As the Japanese claim only ten hits, perhaps some of the holes noted were caused by shot going in one side and coming out on the other. She had one officer killed and—besides her captain who had a very slight wound in the face—one officer wounded. Of the rest of the crew 40 were reported killed and 61 wounded, making in all 41 killed and 62 wounded out of 535. It is not unlikely that some of the men reported killed were drowned, for the Japanese Consul at Chemulpho reported that six bodies had come ashore, and some of the ship's officers put their killed at 30. Two bodies floated up in March and were buried by the Japanese. There was a large hole in the side of the Varyag, her steering-gear was damaged, and she was on fire abaft, as was the case with the armoured Japanese cruiser Iwate off Port Arthur. The Korieits had already recognised the hopeless character of the struggle in which she was engaged and had steered for the anchorage.

Russians retire and destroy their ships.

Being greatly out-matched by her opponents the Varyag now did the same, but she fired while retiring at the Japanese who did not reply. Her principal armament was still serviceable; but one of the smaller guns had been struck by a Japanese shot and had been hurled across the deck. The hole in the Varyag's side could have

* Neutral observers also put the least distance between the two sides at 3800 yards.

been patched up, and she still contrived to keep afloat. It was thought that by proceeding at her utmost speed, instead of the 16 knots which she had kept up during the fight, she might have run through the Japanese Squadron and escaped. Seeing what the Japanese fire had already done to her it is highly improbable; and had she done so she would almost certainly have fallen into the hands of Admiral Togo's Fleet. The proper course was that which the Russian senior officer now took. He caused the ships to be destroyed. The wounded were removed from the Varyag, the more serious cases to the shore, where they were humanely received in the Japanese hospital, and the others to three of the neutral ships, the Talbot, Pascal, and Elba. The Sungari was set on fire and sunk, and the Korieits was blown up, her hull breaking into three pieces and the fore part turning bottom up. It was first intended to blow up the Varyag, but in order to avoid serious danger to the neutrals at the anchorage the crew were removed by the boats of the three neutral men-of-war above mentioned and taken on board those ships, where the crews of the Korieits and the Sungari also were received. The greatest number was taken on board H.M.S. Talbot.

Comments on the action.

The brilliancy of the flash occasioned by the explosion of the Japanese shells led to the belief that their bursting charges were composed of a high explosive, perhaps that invented by Mr. Shimose. It is remarkable that every person killed or wounded on board the Varyag was on the upper deck or above it. Had the ship been an armoured instead of a merely protected cruiser her condition at the end of the fight would not have been very different from that actually existing. Some men were burned to death, by the ignition of their clothes due either to the bursting of a shell close to them or to the explosion by one of the Japanese shells of an accumulation of ammunition on the Varyag's deck. Several of the wounded were hit in many different places. One man had as many as 135 minute wounds in one leg. This was due either to fragments of steel knocked off from the ship's fittings or to the fact that the explosive used in the Japanese shells burst them into very small fragments.

Disposal of Russian crews.

Either because of the damage to her steering-gear or by deliberate plan the Varyag during part of the action manœuvred so as to turn in a small circle. This kept the range almost constant for the Japanese gunners and greatly helped them to hit their object, whilst it must have seriously impeded straight shooting on the part of the Varyag's own gunners. The Japanese had a right to claim the unwounded officers and men who had been succoured by the neutral ships as prisoners of war. The case, however, led to negotiations with the countries concerned, and it was eventually decided that the rescued

officers and men should be allowed to return to Russia. Over 300 had been received by H.M.S. Talbot. They were in time transferred to H.M.S. Amphitrite, which ship brought them to Mirs Bay, near Hong-Kong, and they were there put on board the merchant steamer Nam-Sang, which had been chartered and fitted for the purpose, and in her were conveyed to Ceylon, where they embarked in a mail-steamer for Russia. The officers and men rescued by the Elba and Pascal returned to Russia from Hong-Kong and from Saigon in a steamer of the Messageries Maritimes Company.

Question as to the "neutrality" of Chemulpho.

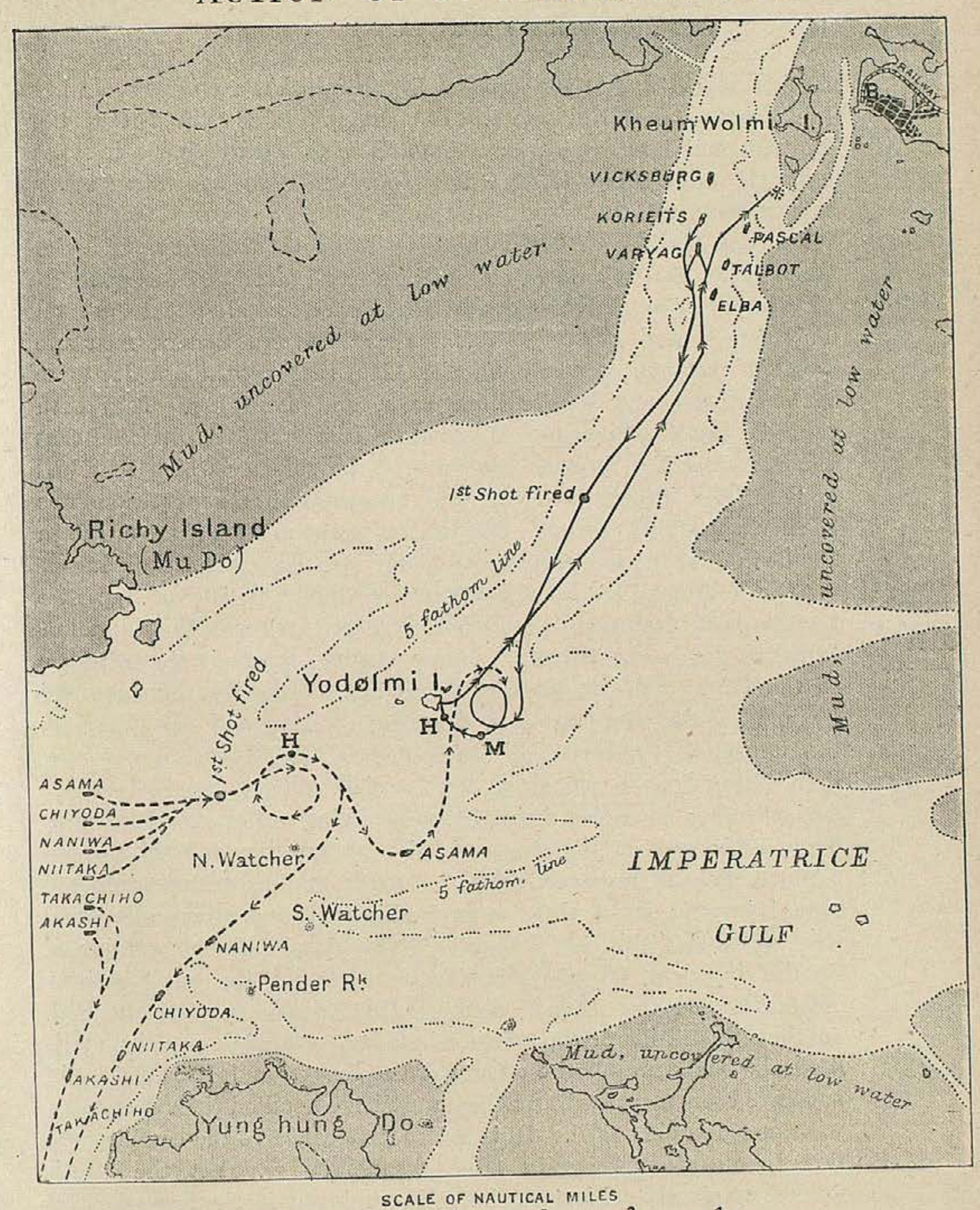
What may be called the status of the anchorage at Chemulpho at the time of the above fight is a subject of the utmost importance to naval officers. As Russia had already, and whilst negotiations were being carried on, violated Korean "neutrality" * near the Yalu River, Japan was fully justified in following her example. As a matter of fact the action between Rear-Admiral Uriu's Squadron and the Varyag and Korieits was fought well inside Korean territorial waters, and this without any remonstrance on the part of any neutral Navy represented at Chemulpho. Not one of the neutral officers there took any step showing that he considered it any part of his duty to vindicate Korea's right of neutrality. When however, an action was imminent in the restricted waters of the regular anchorage, where an action could not possibly have been fought without serious danger to the neutral men-of-war and to the lives of their crews, the British, Italian, and French captains protested, their protest being prompted by no desire to preserve the inviolability of Korean territorial waters but by a determination—the wisdom of which it is impossible to question—to prevent their ships from being injured, perhaps destroyed, and their officers and men from being killed and wounded. The legitimacy of this protest was practically acknowledged by Admiral Uriu by his refraining from fighting at the anchorage. The supposition that Korea could effectually guard her neutrality would excite hilarity amongst people knowing the true state of that country.

Accidents due to submarine mines.

On February 11 an incident occurred which was repeated on several occasions afterwards. The Russian mining-transport, Yenisei, whilst laying mines at Dalny was blown up by one of them, and it was reported that four officers and 92 men had been lost in her. She had laid 400 and was destroyed by the 401st. The cases of ships being destroyed by mines will be referred to later. The telegram announcing the destruction of the Yenisei stated that the mines she had laid had been blown out to sea by a storm. It

* Korea was "neutral" in the real, if not in a formal, sense, hostilities between Russia and Japan not having yet begun.

ACTION OF 9TH FEBRUARY, 1904.



B *British Consulate.* ✱ *Spot where Korieits blew up after the action.*
Varyag anchored, on her return, in the same place that she left.
Varyag and Asama were at **H** *at the same time.*
Where Varyag's track touches Yodolmi is where she went aground after her steering gear was deranged. She had suffered so much when turning, that at **M** *it was decided to go back.*

further reported that the cruiser Boyarin had run ashore at Dalny (on February 12) and was a total wreck. It is stated that the Boyarin had been sent from Port Arthur to Dalny to see in what state the mine-field was after the storm, and that she found many mines loose and drifting about the harbour. She was either blown up by one of these, or in her efforts to avoid them ran aground, and the weather at the time being rough, became a complete wreck.

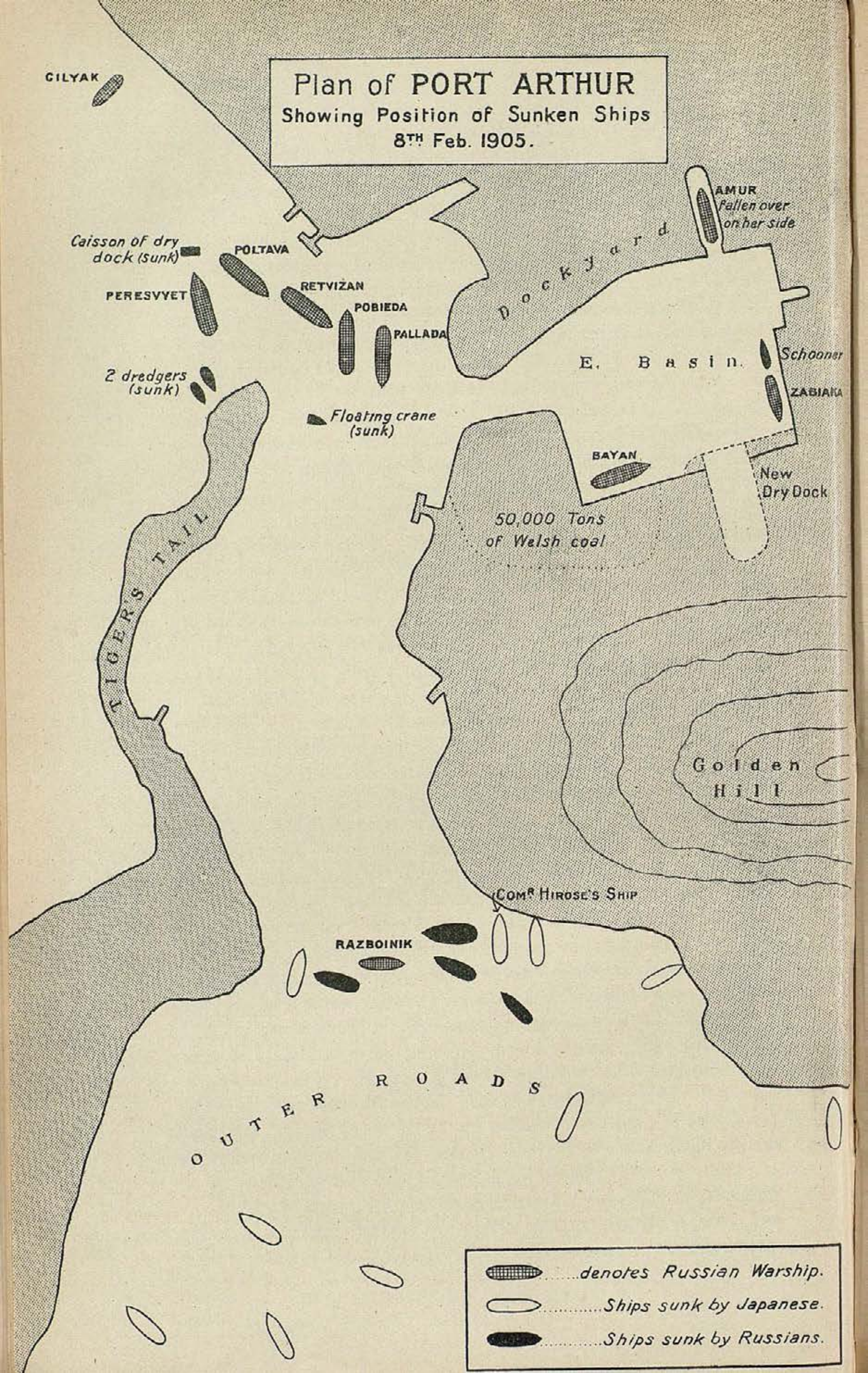
Vladivostock squadron.

The Russian Cruiser Squadron at Vladivostock put to sea on February 9, and proceeded towards the Tsugaru Straits, near the western entrance of which, on the 11th, they captured a Japanese merchant steamer, removed her crew, and sank her. They then chased a small steamer into Hakodate. It was at first supposed that the Russians had drowned the crew of the steamer which they had sunk. The incorrectness of this unwarrantable supposition was shortly aftewards proved. The Russian ships made a short cruise in the Sea of Japan, and returned to Vladivostock on February 14.

Another torpedo attack at Port Arthur.

On February 13, in a heavy snowstorm, a flotilla of Japanese torpedo-boat destroyers proceeded to Port Arthur. The division leaders' flag-boats Hayatori and Asagiri, reached the entrance to the Port. The Asagiri was heavily fired upon by the forts and by one of the Russian men-of-war at 3 a.m., and, as stated by the Japanese, "made a mis-discharge." The Hayatori at 5 a.m. found herself near enough to the Russian ships to send a torpedo against one of them, her estimated range being rather over 500 yards. Some of the crew of the Hayatori believed that they saw the torpedo explode, and the Japanese, not unnaturally, claimed to have inflicted some injury on one of their enemy's ships. It was afterwards found that no Russian ship was damaged by this attack; though, as claimed by the Japanese, "it was effective in increasing the terror already created among the enemy's fleet." This episode supplies us with another illustration of the restricted efficacy of torpedo attacks. The dash and endurance of the officers of the Asagiri and Hayatori could not have been surpassed, and they must have handled their destroyers with incomparable skill. It is not easy to conceive the conduct of a torpedo operation being in more capable hands. Yet the attack failed completely. Most of the craft employed in the operation did not reach the scene of action. The two that did reach it were unmolested by any attempt at an offensive defence. Their direct objective, however, had not been precisely located for them, and it is not surprising that their torpedoes did not hit a ship.

It may be stated here that on February 17, Vice-Admiral Makaroff was appointed Commander-in-Chief of the Russian Fleet in the Far East in place of Vice-Admiral Starck, who returned to St. Petersburg.


Plan of PORT ARTHUR
Showing Position of Sunken Ships
8TH Feb. 1905.
CILYAK
Caisson of dry dock (sunk)
POLTAVA
PERESVYET
RETVIZAN
POBIEDA
PALLADA
2 dredgers (sunk)
Floating crane (sunk)
Dockyard
AMUR
fallen over on her side
E. Basin.
Schooner
ZABIAKA
BAYAN
New Dry Dock
50,000 Tons of Welsh coal
TIGER'S TAIL
Golden Hill
COMR HIROSE'S SHIP
RAZBOINIK
OUTER ROADS
denotes Russian Warship.
Ships sunk by Japanese.
Ships sunk by Russians.

Attempt to block up the entrance to Port Arthur.

To the Japanese an indispensable condition of success in the war was ability to convey a great army across the sea between Japan and the continent without meeting any serious impediment. Any operation that would tend to render the Russian Fleet immobile would help largely to bring about the desired condition. Accordingly, on February 24, an attempt was made to confine the Russian ships in Port Arthur by sinking vessels in the entrance channel. On the 23rd the Japanese Fleet moved towards Port Arthur and despatched the torpedo flotilla convoying five specially prepared merchant steamers to block the mouth of the harbour. The five steamers were officered and manned by 77 volunteers. At 4 a.m. on the 24th these vessels approached the spot indicated, passing south of Lao-ti-shan with the steamer Tenshiu-Maru, of 2943 tons, leading. She steered too much to port, and when she reached a point about three miles south-west of the harbour entrance it appeared that she was struck by a shell, and ran ashore. The other steamers altered course to the northward and eastward, the Russian searchlights causing them great difficulty in their movements. The Russian fire, which is described as violent, damaged the steering gear of the Bushu-Maru, of 1245 tons, which vessel became unmanageable. She grounded close to the Tenshiu-Maru, blew up, and sank. The Buyo-Maru, of 1163 tons, was so seriously damaged by the enemy's fire that she sank before she could reach the entrance. The Hokoku-Maru, of 2776 tons, blew herself up close to the lighthouse on the left hand side of the entrance. The Jinsen-Maru, of 2332 tons, also blew herself up and sank, but not in the channel. As a display of remarkable, indeed astonishing, coolness and courage on the part of the Japanese officers and men employed in it this operation was in the highest degree praiseworthy. Nevertheless, as the Japanese Admiral reported, "the attempted blocking seemed a comparatively small success, to our great regret." The operation in fact had completely failed. No operation of the kind on any that can be called a considerable scale ever has succeeded. To prove that it had failed, when the Japanese Fleet stood in towards Port Arthur on February 25, they found the three (now repaired) Russian ships, Bayan, Askold, and Novik, cruising outside. There was some exchange of shots between the Russians and the Japanese, and one man was killed and one wounded on board the Yashima, and three wounded on board the Shikishima.

Japanese use of "flying" or temporary bases.

The procedure of the Japanese Navy in this war as regards the selection of a base of operations conformed to that which has been followed by other navies in earlier wars. The Japanese occupied a succession of temporary bases, each one nearer to the objective than the last. Admiral Togo's fleet first used a bay, believed to be Mokpho,

near the south-western corner of Korea. The fleet and destroyers in their voyage to and from the immediate neighbourhood of Port Arthur are said to have consumed between 10,000 and 11,000 tons of coal, the average daily consumption exceeding 1000 tons, and the absence from the base lasting from eight to ten days. The desirability, indeed the necessity, of reducing this great consumption of coal, which was burned almost entirely in going to the base to replenish bunkers and returning to the immediate scene of operations, induced Admiral Togo to occupy a less distant place. At first Chinnampo was used by some, if not all, of the ships. A still nearer base, especially for a fleet accompanied by torpedo craft, was desired; and on February 29 the Japanese took possession of Hai-yun-tao, one of the Elliot Islands. At a later date, when the country round Port Arthur was occupied by their troops, they moved their base to Dalny, still nearer to the scene of active operations. It will be seen at once how greatly their action would have been hampered and their strategic mobility diminished had they been obliged to depend on a fixed base with coal and store establishments defended by permanent fortifications.

Partial cannonade of the Vladivostock defences.

Adhering to the intention of doing everything that could be devised to keep the Russian ships from disturbing the transport of their troops, the Japanese sent a squadron under Vice-Admiral Kamimura to cannonade Vladivostock. It is not likely that they believed that attacks of the kind on such fortified places as Port Arthur and Vladivostock would in themselves be decisive, but they probably expected to interfere with the repair of damaged Russian ships, harass the crews of ships in port, and perhaps do some harm to the dockyards. At 8.50 a.m. on March 6, seven vessels, which turned out to be Japanese men-of-war, were sighted south of Askold Island, near Vladivostock. At 1.30 p.m. they opened fire at a distance of about 10,500 yards. About 200 shells were fired, and, according to the Russian report, no damage was done, as most of the shells, though charged with a high explosive, failed to burst. At 2.20 p.m. the firing ceased, and the ships stood off to the southward. The Russian batteries made no reply to the Japanese fire.

On March 8, 1904, Vice-Admiral Makaroff hoisted his flag at Port Arthur and assumed command of the Russian Fleet.

Renewal of torpedo attack at Port Arthur. Action between destroyers

On March 10 the Japanese, as reported on the following day, again attacked the Russians at Port Arthur. The attack was carried out as follows: Two flotillas of destroyers (A and B) approached the mouth of the harbour at midnight on the 9th and remained till daylight on the 10th. The B flotilla laid down a special kind of mine, believed to be the mine invented by Captain Oda, which anchors itself and is fitted with a device for retaining its sub-

mersion automatically. The Russian batteries fired on the flotilla apparently without effect. At 4.30 a.m. on the 10th the A flotilla encountered a Russian destroyer flotilla, consisting of about six vessels, at a point south of Lao-ti-shan, and a severe engagement at close range followed and lasted about twenty minutes. The Asashio, Kasumi, and Akatsuki "fought almost side by side" with the Russian destroyers, on which they poured a heavy fire. The combatants were near enough to each other to hear the cries of the wounded on board an opponent. The Russians, having apparently sustained considerable damage, retreated. The Japanese craft also suffered more or less, and had seven killed and eight wounded; the Akatsuki suffered most; the auxiliary steam-pipe burst and four men were scalded to death. The B flotilla, whilst coming away from the mouth of the harbour at 2.0 a.m. discovered two Russian destroyers returning to port, and at once engaged them. The fight lasted about an hour. One Russian destroyer got away, the other, the Steregustchi, was much injured, and was captured by the Sazanami, which took the prize in tow; but the tow-rope parted. Four of the crew of the Steregustchi were removed from her and she sank at 10.15. The B flotilla suffered some but no very great damage, and the loss was two killed and four wounded. "All our destroyers," reported Admiral Togo, "are effective for fighting and taking part in any proposed movement." The success with which the Japanese kept their destroyers efficient, though constantly at work, was remarkable, and indeed unprecedented; and the rapidity with which those injured were repaired without returning to a dockyard was astonishing. For the first seven or eight weeks of the war, and perhaps for a much longer period, the whole Japanese force of destroyers was kept at or near the scene of operations, not one having to be sent to a dockyard for refit, and this though they were constantly steaming and frequently exposed to the enemy's fire. This capacity for keeping in a perfect state of efficiency modern men-of-war, fitted as they are with delicate and complicated machinery, was displayed by the Japanese in the case of their ships of all classes, notwithstanding that their Fleet was continually cruising month after month and was exposed to the hazards of war. There is no Navy in the world that can show an experience, even though it be but a peace experience, equal to this.

Sortie of some of the Port Arthur ships.

Before the destroyer action was over, Vice-Admiral Makaroff went out of the harbour with the Bayan and Novik to support his own destroyers, too late however to prevent the loss of the Steregustchi. The Japanese Cruiser Squadron approached the harbour, and the Russian ships had to go back again. Admiral Togo then

detached cruisers to Talienwan Bay and also to a bay on the western side of Liautung, and ordered others to station themselves on a line drawn from the harbour entrance so that they might observe and report the effect of the fire from the battleships which he was about to begin. The Japanese capital ships carried out an "indirect" bombardment of the harbour from 10 a.m. till 1.40 p.m. At 2 p.m. all the Japanese ships withdrew to their appointed rendezvous. Some damage was done by their fire, which was delivered at ranges between 12,000 and 13,000 yards. Some buildings in the new town were shattered. The Retvizan was hit, and had two men killed; on board the other ships one man was killed and five men wounded. In the shore batteries six were killed and four were wounded. Also four civilians were killed and several wounded. Attacks of this kind, which it will not be necessary to describe in detail, were made by the Japanese on several occasions. The general plan was for the firing ships to keep as much as possible in the "dead angle" in shore by the Lao-ti-shan promontory. It was found when the ships turned the necessary number of points to alter course away from the mouth of the harbour which they had been approaching, that they came so far out from the "dead angle" that they were exposed to a heavy fire from the batteries. To obviate this they went astern before the turn was completed, and keeping under cover went ahead again and turned. Later on, the Russians mounted guns which searched the waters previously covered from their fire. The cruisers sent round to Pigeon Bay found the wreck of the Russian destroyer Vnushitelni which the Japanese claimed to have destroyed on February 25.

Explanation of frequent bombardments.

It is probable that the Japanese were induced to engage in these frequent bombardments of the Russian fortified port by the hope of keeping their enemy occupied at home. There was a fair chance of shells falling where their bursting would interrupt work being done to any ships in port needing repair, and the moral effect of bombarding an enemy rarely able to see his assailants, and even less able to make an effective reply to their fire, may be given some value. It continued to be a great object of the Japanese to prevent the transport of their armies to the mainland from being interfered with; and any proceeding which would tend to keep the Russian Fleet away from the Japanese over-sea lines of communication helped them to attain that object. They cannot have failed to divine the attraction which the supposed shelter of a coast-fortress had for the Russian Navy, and it was strategically correct on the part of the Japanese to do what they could to encourage the predilection of their antagonists for the cover afforded by fixed defences. The

sequel will show how fateful that predilection was; and in the demonstration lies one of the great lessons of this war. The Japanese Fleet was so skilfully handled that its ships were not exposed to any serious risks from the strong land batteries. The expenditure of ammunition by the ships could easily be made good as long as their communications remained virtually unobstructed. The wear and tear of guns—it being more than doubtful if those of the heavier natures could be replaced—were more serious matters. Even if not allowed to go far, a falling off in accuracy of shooting might be the result. It may be assumed that this was allowed for, and that the number of rounds fired was not sufficient to cause any material deterioration of the rifling of the guns.

Another sortie from Port Arthur.

On March 12 Vice-Admiral Makaroff put to sea with four battleships and a cruiser. On the 13th he exchanged a few shots with some Japanese cruisers, and in a day or two returned to Port Arthur. Whether his sortie had any other object than that of giving to the crews of the ships under his orders a little sea-experience and enabling himself to see what his force was like in blue water is not apparent. It showed that the entrance channel to the port was practically unobstructed. During another Japanese bombardment on March 22, Admiral Makaroff again put to sea with a squadron of battleships and cruisers, and exchanged shots with some of the Japanese ships. It was no part of the plan of the latter to engage an enemy's ships and batteries at the same time. They accordingly drew off to the south-eastward and were not followed. On March 26, Admiral Makaroff went to sea again and, after sinking a Japanese steamer, again went into harbour.

Second attempt to block up the entrance channel to Port Arthur.

It being obvious that the attempt made by the Japanese to block up the entrance to Port Arthur by sinking vessels in it had proved abortive, they decided to make another attempt of the same kind. Four steamers of about 2000 tons each were employed for the purpose and sent in about 2 a.m. on March 27. The leading steamer is said to have been hit by a torpedo from the destroyer Silni, which brought the steamer's bow down deep in the water. Two Russian gunboats, the Bobr and Otvazny (armoured), had sighted and opened fire on the approaching steamers. The operation was marked by the death of Commander T. Hirose of the Japanese Navy, who had, on the former occasion of attempting to block the channel, as well as on this, shown conspicuous gallantry and self-devotion. The complete failure of this blocking operation became apparent when at dawn Admiral Makaroff again took a squadron out of harbour. He drove off the inshore Japanese cruisers, but did not come into contact with the latter's main body. He returned to harbour in the evening, and

was able to report that the entrance was "still entirely unimpeded."

Attempt to block up the entrance channel to Port Arthur with mines.

In the night of April 11 and 12, 1904, the Japanese sent in the mining-transport Koryo-Maru, supported by two divisions of destroyers and one division of torpedo-boats, to lay submarine mines near the mouth of Port Arthur. In support, or at least not far off, was a squadron of cruisers. Admiral Togo reported that the mining-transport and her escort of torpedo craft arrived outside Port Arthur at midnight, "and succeeded in quickly sinking mines at several points outside the harbour as projected." If this operation was an attempt to block up the harbour by placing mines in the entrance channel so that it could not be traversed without passing over a mine it was a failure. It is doubtful if the attempt had much chance of success, experience of peace manœuvres when guns are loaded with blank cartridge only having shown that an operation of the kind is usually, if not invariably, a failure. On this occasion some of the mines are reported to have been floating mines, connected together by a line or hawser, so that when the stem of a passing ship struck the hawser the mines would be swept alongside and exploded on either side; others are supposed to have been of the Oda type. There may be a few people who believe, or who before this case occurred had believed, that mines of the latter kind could be kept securely in position in unsheltered waters during bad weather. A little knowledge of what can be effected by a heavy sea in soundings, i.e., in moderately shoal water, in the case of heavy wrecks, far more securely attached to the bottom than a mine of any kind can be, would suffice to dispel this belief.

Admiral Makaroff's last sortie. Destruction of the Petropavlovsk.

At 8 a.m. on April 12, Vice-Admiral Makaroff put to sea with three battleships and three cruisers, thus proving that the channel was clear. His flag was hoisted in the Petropavlovsk, and a fourth cruiser, the Bayan, joined him outside. The Japanese Third or inshore cruiser Squadron, seeing that the Russians had cleared the space believed to be mined, retired followed by their enemy, who fired on them at long range. The retiring Japanese Squadron drew the Russians after them about fifteen miles to the south-eastward. The first Japanese Squadron, which was hidden by a fog about thirty miles off, having received a wireless telegram from the third Squadron, hurried forward, together with the Nisshin and Kasuga to join in engaging the Russians. The fog cleared away, and Admiral Makaroff, seeing the strength of the force with which he was likely to be engaged if he stood on as he was going, altered course and retraced his steps towards Port Arthur. The Russian ships seem to have been roughly formed as follows:—The Petropavlovsk, Diana, Askold, Novik in

line ahead; the Pobieda with the Poltava astern of her abaft the Petropavlovsk's starboard beam; lastly the Bayan on the port beam of the Novik. When to the eastward of the line prolonging the entrance channel to seaward and some distance—according to one account one and-a-half miles, according to another two miles—from the mouth of the harbour, the Petropavlovsk was seen to heel over and "in an incredibly short time" to sink. Her hull was enveloped in white smoke succeeding a tremendous report. She is reported from a Russian source to have struck a line of floating mines which, on contact, exploded. When the smoke cleared away only her masts were above water. The ship sank in two minutes. Vice-Admiral Makaroff, Commander-in-Chief, the eminent painter Verestchagin, and about 550 officers and men perished with the ship. The first official report stated that of those on board only the Grand Duke Cyril, six officers, amongst them the captain, and thirty-two seamen, all of them wounded, were saved. Some others were picked up later, but the total number of those who escaped is not put at more than eighty-five. The Pobieda struck a contact mine and had a hole in her hull above the water-line on her starboard side amidships. If this was caused by a mine it must have been a mine that had become detached from the apparatus for keeping it submerged and was floating on the surface of the water. She was repaired and was in the line of battle on August 10.

Comments on the loss of the Petropavlovsk.

In some quarters it was held that the destruction of the Petropavlovsk was only indirectly due to the explosion of a mine, and that at least one internal explosion immediately followed that of the mine, the ship being thereby effectually destroyed. Whether there was an internal explosion or not, it was contact with the mine that caused the loss of the ship and nearly all her crew. Even if it stood alone, the fate of the Petropavlovsk would be enough to disprove the doctrine that "the large ship is more likely to survive the effect of a torpedo than a small one." In broad daylight, surrounded by her friends, and there being no enemy's ships to fire at her except some at very long range, the battleship Petropavlovsk, after coming in contact with a mine, sank in two minutes—so rapidly, in fact, that nearly seven-eighths of her crew went down with her. As will be seen later, her case does not stand alone, and the inability of huge dimensions to save a ship, if injured by a severe underwater explosion, from rapid sinking has been proved more than once in this war.

Use of submarine mines.

As regards the mine itself, some reflections are unavoidable. We may dismiss, as in the highest degree improbable, the story that it was one which had been purposely laid in the place in which it

exploded, and that the Petropavlovsk had been decoyed into passing over the exact spot. The Japanese laid mines outside Port Arthur with a two-fold object. They hoped that the knowledge that mines had been laid in the waters of approach to the port would impair the belligerent activity of the Russian Fleet by keeping it in altogether. They also hoped that the mines might cause it serious loss if the Russians ventured to come out. The Japanese naturally believed that their mines had been more accurately placed than they really were, and the temporary withdrawal of their inshore ships was probably intended to draw the Russians after them and over the mines. Had the destruction of the Petropavlovsk been due to this procedure she would have been blown up on her outward passage, and not on her way home after having reached a point fifteen miles from the harbour's mouth. If the mine which destroyed her was one of those laid in the night by the Japanese, it must either have broken adrift from its moorings or have been unmoored and submerged. In the former case the mine-mooring system had demonstrably failed, as well as the attempt to place the mines exactly in the channel of egress. If it were a submerged drifting mine, the Petropavlovsk could have struck it only by accident, and it must have constituted a serious danger—how serious a danger the early sequel showed—to the Japanese ships as well as to the Russian. Some people still think that the mine which destroyed the Petropavlovsk was one of the many laid by the Russians themselves. Some of these mines we know had broken loose from their moorings, a portion of them at least being believed to have drifted out to sea.

The Russian Navy had lost in Admiral Makaroff a highly capable officer, and the blow which it received by his death was a severe one, in the circumstances of the moment a very severe one indeed. His place was taken by Vice-Admiral Skrydloff, who had been in command of the fleet in Far-Eastern waters before Vice-Admiral Starck. The new Commander-in-Chief did not succeed in getting into Port Arthur because it was closed by the Japanese, both by land and sea, before he reached Manchuria. He therefore proceeded to Vladivostock.

Movements of the Vladivostock cruisers.

The Russian vessels continued to make cruises from Vladivostock. On the 25th two torpedo-boats entered the harbour of Gensan, on the eastern coast of Korea, and sank the Goyo-Maru, a Japanese merchant vessel. The Rossia, Gromoboi, and Rurik remained outside the harbour during this operation. The cruise of these ships on this occasion attracted a great deal of attention because of a particular episode in it. Early on April 25, 1904, the transport Kinshu-Maru, carrying a company of infantry, had left Gensan for Iwon, further north, escorted by the

11th torpedo flotilla. It being feared that she would fall in with the Russian cruisers the Japanese Second Squadron and destroyers, which had arrived at Gensan on the 26th, that is about twenty-four hours after the Kinshu-Maru's departure and less than half a day after the destruction of the Goyo-Maru, prepared to go to sea to protect the transport. The 11th torpedo flotilla, however, returned and reported that the troops had landed at Iwon, and had re-embarked at 6 p.m. on the 25th, and that the Kinshu-Maru, accompanied by the torpedo flotilla, then started on the return voyage to Gensan. The weather was threatening, and the flotilla had to put into Cha-ho-po. The Kinshu-Maru went on alone, and was found by the Russian cruisers. The latter removed from her seventeen officers, twenty soldiers, sixty-five men belonging to the transport's crew, and eighty-one coolies. Five of the military officers and seventy-four men refused to surrender. It is stated by both sides that these fired with their rifles at the Russians; but according to the latter it was before the ship was torpedoed; according to the Japanese the fire was not opened till afterwards. The coxswain and four men of a Russian boat, which had just shoved off from the transport, were wounded. The Rossia then opened fire on the Kinshu-Maru and discharged a torpedo, which sank her. The Japanese report is that, seeing the vessel was about to founder, and disdaining the chance of being picked up in the water as prisoners by the Russian boats, "the Japanese officers ordered their men to die, and, after giving three cheers for the Emperor, committed *hara-kiri,* facing the Russian warship, and the men followed their example." A few soldiers, however, were saved, and it was from them that the story was obtained. The world in general was stirred by the relation of this heroic deed. It showed that notwithstanding thirty years of commercialism and of imitation of Western "civilisation," the spirit of chivalry and the honour of the *Samurai* were still living forces in Japan. To the unreflecting it may have seemed a useless sacrifice; but the effect of the deed was not local, but widely felt. Every Japanese soldier and sailor who came to know the story, and all came to know it, derived genuine consolation from the heroism of his brothers-in-arms, and the *moral* of the whole Army and Navy of Japan was braced and refreshed by the example of the men who died on board the Kinshu-Maru. We must not, however, allow this brilliant episode to blind us to facts and lessons. Not only was the action of the Russians in sinking a vessel with men on board who refused to surrender a perfectly legitimate operation of war, it was also one for which their enemy himself had supplied a precedent in the sinking of the Chinese transport Kowshing in 1894.

The Japanese had practically the command, or as Mahan with

greater lucidity calls it control, of the sea. Yet the Vladivostock cruisers made more than one unmolested cruise, though a squadron under Vice-Admiral Kamimura had been specially assigned to the duty of looking them up. "Control of the sea," says Mahan, "however real, does not imply that an enemy's single ships or small squadrons cannot steal out of port, cannot cross more or less frequented tracts of ocean, make harassing descents upon unprotected points of a long coast-line, enter blockaded harbours." The blame poured upon Admiral Kamimura because the Vladivostock cruisers were not instantly stopped from cruising was uncalled for, and its publication evoked uncomfortable reflections on the defective character of the appreciation of strategic conditions evinced by those who posed as instructors of a public even less learned than themselves. In sending the Kinshu-Maru on her mission the Japanese had not exactly "chanced it," as the saying is. They had provided her with an escort of torpedo-boats, but the event showed how impotent such an escort is.

Transport of Japanese armies to the main land.

The relative inactivity to which the Russian Fleet at Port Arthur had been reduced prompted the Japanese to transport large bodies of troops across the sea. In the brief account of the operations which is all that the information or the space available will permit, detailed notice cannot be taken of the transport arrangements. The Japanese Navy, which had made the proceedings possible, lent important assistance in completing it, in some cases landing men to occupy in advance the points on which the disembarkation of the Army was to be effected. At the crossing of the Yalu Japanese gunboats and torpedo-boats detached from the Third Squadron supported the movement. This employment of the Navy was of insignificant importance when compared with its activity in greater operations. Perception of the insignificance is useful to us, for it should enable us to see that the expeditions in which ships' crews for many years past have taken part on shore, and which give occasion for much glorification, are essentially of too secondary a character to merit more than passing notice when a Naval Power is engaged in a real maritime campaign.

A further attempt to block up the entrance channel to Port Arthur.

Of the attempts to block up the entrance to Port Arthur by sinking ships, of which mention has been made already, the third took place on the morning of May 3. Twelve steamers were prepared and eight were sunk. The Russians believed that these had been sent to the bottom by the fire of the Otvazny, Gilyak, and Gremiastchi, and of the batteries on shore and also by torpedoes launched from torpedo-boats. They were, however, sunk by their own crews. The attempt to close the mouth of the harbour failed.

It was not again repeated, the futility of an operation of the kind being now understood.

A series of misfortunes now overtook the Japanese Navy. Vice-Admiral Kataoka with the Third Squadron and the 2nd, 6th, 20th and 21st torpedo flotillas arrived at Ta-gao-kow, a bay adjoining Talienwan, early on May 12. The 12th torpedo flotilla joined him later. Four torpedo-boats were sent to drag for mines. Torpedo-boats No. 48 and 49 discovered a mechanical mine which No. 48 tried to destroy by firing at it. Failing in this, she approached and apparently came in contact with the mine, which exploded. The boat was cut in two and went down in seven minutes; one officer and six men were killed, and seven were wounded. On May 14 the Miyako was blown-up by a mine and sank in twenty-three minutes, with a loss of two killed and twenty-two wounded. On May 15 the Kasuga ran into the cruiser Yoshino in a fog and sank her, only ninety of the latter's crew being saved. On the same day a greater disaster still befell the Japanese. The Hatsuse, Shikishima, Yashima, battleships, with the Kasagi cruiser and Tatsuta mining-vessel, were keeping watch outside Port Arthur, and about 11 a.m. the Hatsuse came in contact with a mine which injured her steering gear; she made a signal for a tug-boat. Thirty minutes afterwards a second mine exploded under her and she "immediately sank" in thirty-two fathoms of water. Of her crew of 795 only 300, including Rear-Admiral Nashiba, whose flag she carried, and Captain Nakao, were saved by the ships around her. According to Russian accounts, the loss of Hatsuse was due to mines deliberately laid for that purpose. The transport Amur was sent out at night to drop mines, at short intervals over a length of one mile, directly across the track which the Japanese squadron had been observed to follow. The next day the Hatsuse, in passing over the line, was blown up. Sinking of the Hatsuse.

The Russians stated that the Japanese battleship Yashima also struck a mine and sank at 3 p.m. on May 15. The captain of the Diana affirmed that he saw her sink. The Yashima seems to have struck a mine and been seriously injured. According to the newspaper report she sank, but not till after her crew had been removed. On the other hand it has been alleged that, though badly injured by a mine explosion, the Yashima was kept afloat until she had been taken into shallow water, where she was allowed to rest on the bottom, and being temporarily repaired was floated and sent to one of the Japanese dockyards for complete refit. Owing to the enviable secrecy maintained by the Japanese, it is still in doubt whether the Yashima was lost or not. One thing may be accepted as certain, The Yashima.

and that is that she was at least so seriously injured as to be unable to participate any more in the campaign ending with the fall of Port Arthur. The diminution of the Japanese Fleet by the above-mentioned accidents was very serious, and the skill with which Admiral Togo disposed his remaining force deserves our unbounded admiration.

Loss by accident of other Japanese ships.

Here may be mentioned other losses of Japanese ships caused by mines exploding beneath them. On June 13 the steamer Taioku-Maru, whilst laying mines near Port Arthur, was injured by one of them. She had one officer and nineteen men killed, and two officers and seven men wounded. On July 5, the small cruiser Kaimon ran on a mine in a fog near Talienwan and sank; the captain, two officers, and thirteen of the ship's company being drowned. The cruiser Itsukushima was stated to have been damaged by a mine explosion on September 3. On September 18, the ex-Chinese armour-clad Heiyen, classed as a coast-defence vessel, was sunk in rough weather by a mine explosion in Pigeon Bay, only four men out of her complement of 210 being saved, according to the newspaper report. On September 3, the ex-Chinese cruiser Sai-yen also was sunk by the same cause, the greater part of her crew being saved. Losses of Japanese torpedo craft, due to mines exploding under them, have also been reported.

Further accidents to Russian ships due to mines.

Besides the Petropavlovsk and the Yenisei, the Russians had lost the destroyer Skory by a mine explosion on March 16. They also lost the Otvazny armoured gunboat, which ran on a mine near Lao-ti-shan on August 18. On August 24 two destroyers ran on mines—one, the Boevoi, was sunk. On two occasions—on August 21 and September 20—whilst small Russian steamers were searching for mines, one of the steamers was blown up. The Gilyak was reported by the Japanese to have been sunk at Port Arthur on June 4. If sunk, she was refloated, but had become unserviceable.

Risks due to a side's own mines.

In most of the cases of destruction of ships by submarine explosion, it is impossible to say by whose mines they were destroyed. Both sides laid mines in large numbers, and it may be taken as certain that some, if not many, broke loose from their moorings. Some, indeed, may have been put in the water to serve as drifting mines. It is, of course, possible that every Japanese vessel destroyed or injured owed her misfortune to a Russian mine, and that every Russian vessel in like case was the victim of a Japanese mine. There is, however, no proof whatever that it was so, and it is at least probable that the Petropavlovsk foundered after contact with a mine laid by her friends, and possible that the fate of the Hatsuse and of the Yashima—assuming that the latter was at any rate injured

—was due to the explosion of mines intended not for them, but for the ships opposed to them. Beyond the fact that great size gives a ship no sort of security against destruction if a mine explodes beneath her, and does not even give her the advantage of less rapid foundering, this war has taught us little or nothing about submarine mines which we did not know before. We knew the effect of underwater explosions in recognised conditions, and we knew that whether friend or foe ran on a mine the result would be the same. We knew that, except in special and rare circumstances, a mine is likely to be as dangerous to the side which uses it as to the side against which it is intended to be used, and experience of the hostilities in the Far East confirms our knowledge. The lesson taught us is that we should resort to the use of submarine mines only in quite exceptional cases—cases, indeed, so exceptional and so unimportant relatively to the main issue of a great war, that no considerable diminution of belligerent efficiency need be expected if we omitted the use of mines altogether. The risk from errant mines incurred by neutrals engaged in legitimate pursuit of their occupation, and the consequent liability of the mine-using combatant to become involved in serious complications should be borne in mind, and may well make us doubt if the advantages due to laying submarine mines are as great as the disadvantages.

Operations of the Vladivostock cruisers.

The Vladivostock Squadron had suffered a serious blow in the complete loss of the Bogatyr, which ship between May 15 and 20 ran on a rock near Vladivostock. It being found impossible to save her, the ship's light guns, principal stores, and entire crew were removed, and the wreck was blown up. On June 12, 1904, the Rossia (flag), Gromoboi, and Rurik, under Vice-Admiral Bezobrazoff, put to sea to operate against the sea communications of the Japanese forces serving on the continent. The squadron returned on June 20, having proceeded nearly as far as the Straits of Shimonoseki. On June 15 the Russians fell in with three Japanese transports, the Idzumi-Maru, the Hitachi-Maru, and the Sado-Maru. Refusing to stop, the Idzumi-Maru was fired at, and was struck by several shells. She then stopped, some of those aboard her jumping overboard. The crew finally left her in two boats. The people in these boats, and some of those in the water, were picked up and received on board the Gromoboi, and the Idzumi-Maru was then sunk. The Hitachi-Maru was carrying over 1000 troops; the Sado-Maru had on board twelve officers and some men of the telegraph corps, besides military stores and pontoons. After several shots had been fired warning the Hitachi-Maru to stop, and had been without effect, the Russian guns opened in earnest against the vessel. She then stopped, and began

to lower her boats. She was in a sinking condition, and, as she settled down slowly, the Gromoboi was ordered to expedite the sinking. In this case, as in that of the Kinshu-Maru, there was great loss of life amongst the Japanese officers and men who nobly refused to surrender, thus giving another impressive lesson to all armies and navies. The Sado-Maru also refused to stop, and was torpedoed. The Russians found it possible to capture only twenty-five officers and four foreigners who were on board the transport. Some of the Sado-Maru's people took to the boats; as the vessel was only disabled, and was not really in a sinking condition, those who remained on board were saved after she had drifted for twenty hours.

Admiral Bezobrazoff's squadron then proceeded to the Tsugaru Straits, where it captured a British steamer, the Allanton, laden with Japanese coal, and purporting to be on her way to Singapore. The Russian vessels appear to have met with no molestation by the Japanese torpedo-boats intended to stop hostile ships from passing the Tsugaru Straits. Vice-Admiral Kamimura was informed by scouts at 8.20 a.m. on June 15 of the whereabouts of the Vladivostock cruisers. He proceeded with his squadron, at high speed, towards the spot at which it was expected that the Russians would be; but owing to a dense fog in the Straits of Tsu-shima he did not sight his enemy.

Sorties from Port Arthur. Japanese torpedo attacks.

The repairs of the Russian battleships Cesarevitch, Retvizan, and Pobieda, having been completed, and the ships being fit for sea, Rear-Admiral Vithöft had at his disposal six battleships, the three above named and the Peresviet, Poltava, and Sevastopol; four large cruisers, the Bayan (armoured), Askold, Diana, and Pallada, and the smaller cruiser Novik. With these ships and ten torpedo craft he put to sea on June 23. At 11 a.m. on that day Admiral Togo received from his look-out ship, off Port Arthur, a wireless message informing him that the Russians had come out of harbour. He proceeded to meet them with his whole fleet, "except vessels on special mission." The Russians seemed to him to intend to move to the southward. About 3 p.m., the Russian Fleet being then well out to sea, the Japanese torpedo craft approached to attack. They were driven off by the Novik and the destroyers with her, an example of the advantage of using destroyers for their proper work, of affording an offensive defence against attacks by torpedo craft.

It was nearly 3 p.m. before the whole Russian Fleet was well clear of the approaches to the harbour. Formed in line ahead with the Cesarevitch leading, it headed at high speed in the direction of the Shantung Promontory, and about ten miles from Encounter Rock it came within view of Admiral Togo's battleship division.

The Russians then altered course to south, and Admiral Togo followed, his battleships in line ahead, with three destroyer divisions on his port beam, and the First Cruiser Squadron, apparently a mile, astern of him. Between 6 and 7 p.m. the signal for battle was made in both fleets. The Japanese at first kept a course parallel to that of their enemy, and about 14,500 yards distant from him; after a short period they altered course so as to close. On this the Russian Fleet also altered course. The Japanese made several attempts to get nearer, the Russian Fleet altering course away from them on each occasion, till finally it headed about west, and at 8 p.m. steered directly towards Port Arthur. The Japanese followed the manœuvre, bringing their several squadrons into line abreast. The Japanese torpedo craft were now sent to attack their enemy. The first boats attacked the sternmost ships about 10.30 p.m., as the Russian Fleet in single line ahead was approaching the place in which, about an hour later, it anchored. The Japanese continued their torpedo attacks, making eight in all, at short intervals. The Japanese believed that the Peresviet had been sunk, and the Sevastopol and a cruiser of the Diana type injured. It is certain the Peresviet was not sunk, and it is believed that neither that vessel nor a cruiser were injured. But the Sevastopol, in returning, struck a mine which blew a hole in her starboard side 7 ft. below the waterline 35 ft. to 40 ft. long and 7 ft. by 10 ft. deep. She was repaired in six weeks. Except that the night was clear and the moon was shining, the torpedo craft had the advantage on their side. They knew the exact position of their object, and they were within easy distance of it when they advanced to attack. Nevertheless the numerous torpedo attacks made failed altogether.

Russians misunderstand true objective.

It is not easy to discover any definite plan in these repeated sorties of the Russian Fleet. As far as they were intended to enable the Admirals who had taken command of it at short notice to exercise it and acquaint themselves with its manœuvring capacity, these sorties were intelligible and useful; but even in that case, coming into contact with the enemy and then retiring, could not have had an inspiring effect on officers and men. A cruise merely for exercise ought to have been arranged as far as possible so as not to take the fleet within range or even sight of the enemy. If a sortie was undertaken solely to show that the passage out of harbour was clear of mines, it cannot be considered a judicious performance. It was undesirable from the Russian point of view that the Japanese should be undeceived as to the result of their attempts to block the channel. It is always difficult, and sometimes impossible, to put oneself mentally in the position of another person, especially if that

person has great responsibilities resting on him; and the Russian Admiral may have had strong reasons, of which we are ignorant, for his action. It did, however, appear at the time, as it appears now, that the right course for the Russian Fleet to pursue was, even at the risk of being severely defeated, to make a vigorous attack on its opponents. If it found the channel clear it should have been prepared to go on till it brought its enemy to action, and, once engaged, even if at a disadvantage, it should have persisted in fighting till it had inflicted serious damage on the perhaps victorious ships of the Japanese. The engagements between fleets and squadrons in this war, partial and straggling as they have been, have shown that the conquering side may be injured enough to weaken it seriously. There is no sign that the Russian Commander-in-Chief looked at the war as a whole. As far as can be discerned, his conception of it was so limited as to take in merely the particular campaign or section of a campaign being carried out in the Yellow and Japan Seas. Whilst the Japanese never lost sight of the probability that a strong Russian naval reinforcement would come from Europe, and thus put them in the position of serious numerical inferiority, the Russians in Far Eastern waters seem never to have taken note of this probability or what it involved. Admiral Vithöft, on June 23, 1904, had with him six battleships, four cruisers (of which one was armoured), one smaller cruiser, and ten destroyers. Admiral Togo's force was composed of four battleships, four armoured cruisers, several smaller cruisers, and twenty-two torpedo craft. If Admiral Togo had been able to assemble the whole of his command, and we know from his own report that he had detached some "vessels on special mission," there would have been no very great inequality between the two opposing Fleets. A close and hard-fought action that would have ended in the destruction of the greater part of the Russian Fleet would have most likely caused so much damage to the Japanese that a reinforcement from Europe would have been left virtually master of the situation. Anyone can see now that it would have been better for Russia had her Fleet been destroyed whilst doing damage to the enemy's ships than for it to be destroyed in the "entanglement" of Port Arthur when not a single hostile ship could be brought under its fire.

Further operations and fate of the Vladivostock Squadron.

The cruises of the Vladivostock Squadron had an intelligible object; they were meant to disturb the Japanese communications with the Continent. In this they had some success, as was shown by the destruction of transports, already mentioned. It is quite true that the work done by the Vladivostock Squadron was not great in amount, but they must have caused some inconvenience to the

military forces of Japan engaged in the campaign. Had the Russian cruisers acted separately the inconvenience caused to their enemy would probably have been more serious, because it would have been felt at a greater number of points. Those cruisers, however, had to keep together, because it was expected, perhaps was known, that Admiral Kamimura was looking for them, not with single ships, operating independently, but with a squadron. For any single Russian cruiser to have fallen in with this squadron would have been certain destruction. We may see in this the best justification for making cruisers work in squadrons. By doing so we force the enemy to do the same, and he thereby restricts or sacrifices altogether that relative ubiquity which is the most promising element in the strategy of what may be called the cruiser offensive. It is highly instructive to find that the chief reason for constructing armoured cruisers of great size, viz., that they may be individually superior to any antagonist likely to be encountered, has received no justification from the experience of either side during the recent campaign. Both sides unanimously adhered to the practice of grouping their armoured cruisers in squadrons, and neither cared to trust any of them on a cruise alone.

Towards the end of June the Vladivostock cruisers again put to sea, and captured in the Korea Straits a British steamer, the Cheltenham, carrying railway sleepers to Korea. They were sighted by Admiral Kamimura, who was coming up with his squadron on July 1, but they slipped away from him in the darkness and returned to their port. In the meantime the Vladivostock torpedo flotilla had proceeded to Gensan, where it had destroyed a coasting steamer, a schooner, and a large number of barges. On July 19 the Rossia, Gromoboi, and Rurik left Vladivostock on another cruise. On the 20th they passed through the Tsugaru Straits and entered the Pacific Ocean. The Japanese torpedo-boats were reported to have gone in pursuit; but neither on that occasion nor later, when the Russians were returning, did the torpedo-boats impede their progress. The cruisers ran along the Japanese coast until they were off the approach to Yedo Bay, on which Yokohama lies. They cruised some seventy-five miles south of that place from July 23 to the 29th. They captured and sent into Vladivostock the German steamer Arabia, and sank the English steamer Knight Commander and the German steamer Thea because these two had not coal enough to take them to the Russian port; they also sank a Japanese coasting steamer and four junks. Their activity caused great anxiety in shipping circles, and sailings from the ports of Japan generally were stopped. The three Russian cruisers got back to Vladivostock on August 1.

Cruiser action of August 14.

It will be convenient to follow the fortunes of the Vladivostock cruisers until the end of their activity. They once more left Vladivostock on August 10, the same day, as will be seen hereafter, that the Port Arthur fleet attempted to break through the Japanese Fleet, perhaps with the intention of effecting a junction with its friends from Vladivostock and proceeding with them to that place. On August 14, at 4.30 a.m., Rear-Admiral Yessen, with the Gromoboi, Rossia, and Rurik, approached the parallel of Fusan, and when forty-two miles from that port and thirty-six miles from the northern lightship of Tsashima, altered course to the westward. The object apparently was to make towards the Port Arthur fleet. That force, as will be told hereafter, had already been defeated, and a persistence on the part of Admiral Yessen in standing to the westward would almost certainly have ended in the destruction of his whole squadron. The Russians sighted nearly ahead, but somewhat on their starboard bow, and about eight miles off, a Japanese squadron of four armoured cruisers —the Idzumo (flag), Tokiwa, Azuma, and Iwate, under Vice-Admiral Kamimura, who also had with him the Naniwa and Takachiho, and at least one division of torpedo craft, apparently attended by the Tsushima and Chitose. The four Japanese armoured cruisers were ahead of the rest of their force, which was not visible to the Russians. The Russian Admiral now altered course to seaward, steaming at full speed. The fight, which was one between three Russian armoured cruisers, totalling in displacement 35,389 tons, and four Japanese armoured cruisers, totalling 38,686 tons, began at 5.0 a.m. and at a range of more than 12,000 yards. The Japanese, who had altered course immediately on the Russians having done so, steered a course parallel to the latter's. The Naniwa was now sighted approaching from the southward.

Admiral Kamimura in the night of August 10-11 had received from Admiral Togo a telegram sent to Takeshiki in Tsushima to the effect that the Port Arthur fleet had left harbour and that part of it was supposed to be making for the Korea Straits in the hope of reaching Vladivostock. Kamimura was therefore on the watch. At 4 a.m. on August 14 he was standing to the southward when he sighted the Gromoboi, Rossia, and Rurik about ten miles off and steering in the same direction as he was. Eventually the Russians shaped course to the north-eastward and the Japanese did the same, but not until the former had proceeded some little distance on their new course. The four Japanese armoured cruisers carried sixteen 8-in. and fifty-two 6-in. guns, the three Russians carrying twelve 8-in. and forty-eight 6-in. guns. The Rurik was the sternmost ship of the line and the Japanese concentrated their fire on her at ranges of 4500 to 5500

yards. About 8 a.m. a shell disabled her steering-gear and the tiller got jammed. The Rurik had also received a shot below the water-line and was making water; but, as was shown afterwards, she was not in a sinking condition. She signalled that she could not steer and was unable to comply with a signal made to her to follow the Gromoboi and Rossia at full speed. A fire broke out on her battery-deck, but the crew succeeded in extinguishing it. Kamimura evidently considering that the Rurik could not escape pushed on after the two remaining Russian cruisers. The Naniwa and Takachiho came up and engaged the Rurik. Though the latter's steering-gear was damaged and her speed reduced owing to the water that she had made through the shot hole below the water-line, she was still able to use her guns. How far her armament was serviceable at this stage of the fight is not certain. Admiral Yessen, judging from his report, seems to have been convinced that her guns were in a state to enable her to repel the attack of the Naniwa and Takachiho. Admiral Kamimura was of the same opinion. In a speech made by the latter in Tokio on January 26, 1905, he gave the reason why he did not continue the pursuit of the Rossia and Gromoboi on August 14. He said the Rurik was an armoured cruiser of over 10,000 tons and this type of vessel was not usually sunk by gun-fire only. The vessels in Rear-Admiral Uriu's squadron—whom we now know was with him—"were all second-class cruisers and no match for an armoured cruiser." He therefore became anxious about the fate of his companion-squadron and preferred to ensure the safety of its ships rather than pursue the enemy. Thus he relinquished the pursuit.

The Naniwa and Takachiho, whose effective speed was as great as that which the Rurik could now keep up, "enfiladed her from to-starboard and did great execution with their heavy guns." These two Japanese cruisers were nineteen years old, or seven years older than the Rurik; they were not armoured like that ship; and their united displacement was 7350 tons against the 10,923 of the Rurik. Their concentrated fire told on her heavily and her own fire gradually slackened owing to the displacement of many of her guns. She attempted to put on speed, but the attempt was observed by the two Japanese cruisers which maintained their advantageous position without difficulty. The Rurik's fire ceased at noon as all her guns had been put out of action and she had lost many officers and men. She now discharged a torpedo, but it missed its mark and the other tubes had been damaged. The captain had been killed and the commander mortally wounded. The senior lieutenant was soon wounded. The officer who succeeded to the command, seeing that the four Japanese armoured cruisers were returning from their pursuit of the

Naniwa and Takachiho engage.

Gromoboi and Rossia, and that three more cruisers and five torpedo-boats were approaching, gave orders to blow up the ship. The attempt was unsuccessful because one of the fuses was broken by a shell striking the deck, and the second fuse had got wet and was useless. Orders were now given to open the valves and the ship sank, going down about noon. All her boats had been destroyed and the officers and men who were in the water were picked up by the Japanese. The members saved were sixteen officers (seven of them wounded), one chaplain, four warrant officers (three of them wounded), and 583* men of whom ninety-eight were wounded. The chief engineer was drowned. It was reported that twenty-two officers were killed or mortally wounded. As her complement was 719, the Rurik's total loss, if she had all her crew on board, was twenty-two officers and ninety-four men killed and mortally wounded, and ten commissioned and warrant officers and ninety-eight men wounded. As this amounted to 224 in all or not much short of a third of her established complement she had suffered very severely in a fight which had lasted between seven and eight hours. The Naniwa had three killed and four wounded, and the Takachiho twelve wounded.

When it was noticed by the Russian Admiral about 8.30 a.m. that the Rurik was dropping astern, and, owing no doubt to the injury to her steering gear, was sheering first to one side and then to the other, he continued to steam towards Vladivostock. He had made out that, whilst Admiral Kamimura was following steadily with the four Japanese armoured cruisers, those cruisers were drawing away from Rurik, and he hoped that she would be equal to the task of driving off the Naniwa and Takachiho; and, in spite of the damage she had sustained, she would be able to reach Vladivostock. The hope, in view of an opinion rather widely held of the superiority of one large armoured cruiser to two unarmoured cruisers, each of less than half her size, would not have been considered by many unreasonable.

Result of action.

The engagement now, as far as the armoured cruisers were concerned, became a running one between four on one side and two on the other. Shortly before 10 a.m. the Japanese, at a range of 8000 yards "opened the most deadly fire of the whole engagement," and after five hours' fighting ceased firing and turned back in succession. A fire broke out in a compartment of the Rossia and six men were burned to death. There was also a fire on board the Gromoboi, not caused directly by the Japanese shells, but by one of those shells igniting some cartridges. The fire was put out by a hose-party.

* This makes the total saved 603, of whom 108 were wounded, as stated by Vice-Admiral Kamimura in his speech already quoted.

The Gromoboi had six holes below the water-line and the Rossia eleven. Of the Rossia's principal guns at the end of the battle only three were serviceable. The Gromoboi had four officers killed and four, including her captain, wounded. All the large loss of life in the Gromoboi took place on the upper deck, whilst all the men in the casemates remained untouched, but some of the guns in them were disabled. The captain of the Rossia was killed and six of her officers were wounded. On board the Rossia the men on the upper deck suffered severely, and the crews at the upper guns were changed several times. In both cruisers 135 men were killed and 307 wounded. Admiral Kamimura reported the losses in his four cruisers as follows: Iwate, forty killed, thirty-five wounded; Idzumo (flagship), three killed, six wounded; Adzuma, eight wounded; Tokiwa, three wounded. Including the casualties in the Naniwa and Takachiho the total Japanese loss was forty-six killed and sixty-eight wounded, or 114 in all. The Russian loss greatly exceeded this, being 251 killed and 415 wounded in the three ships; in all 616. As the Rurik was sunk by her own people, not by her enemy; and as the Gromoboi and Rossia got back to Vladivostock, their injuries below the water-line could not have been very serious. We may draw the conclusion that the battle was decided, as battles usually have been, by the number of the *personnel* put out of action.

Attempted escape of the Port Arthur fleet. Action of August 10, 1904.

On August 10 the Port Arthur fleet again put to sea in force. At 5 a.m. the ships began to move into the outer roads, and at 8.30 a.m., in single line ahead, they began to traverse the channel preceded by mine-clearing launches. The cruiser Novik went ahead of the main body. Rear-Admiral Vithöft was in command with his flag in the Cesarevitch. The other ships were the Retvizan, Pobieda, Peresviet (flag of Rear-Admiral Prince Ukhtomsky), Sevastopol, Poltava, battleships, and the Pallada and Diana, cruisers. The first division of torpedo craft took station near the leading battleship. Two gunboats and the second division of torpedo craft accompanied the fleet to protect the flotilla of mine-clearing boats on their way back. The Mongolia hospital ship was in attendance. It will be noticed that the Bayan was left behind. The absence of this important cruiser could not well have been due to any other cause but the delay in making good the damage she had received on a former occasion, as is stated from a mine.* At 9 a.m. the Admiral in

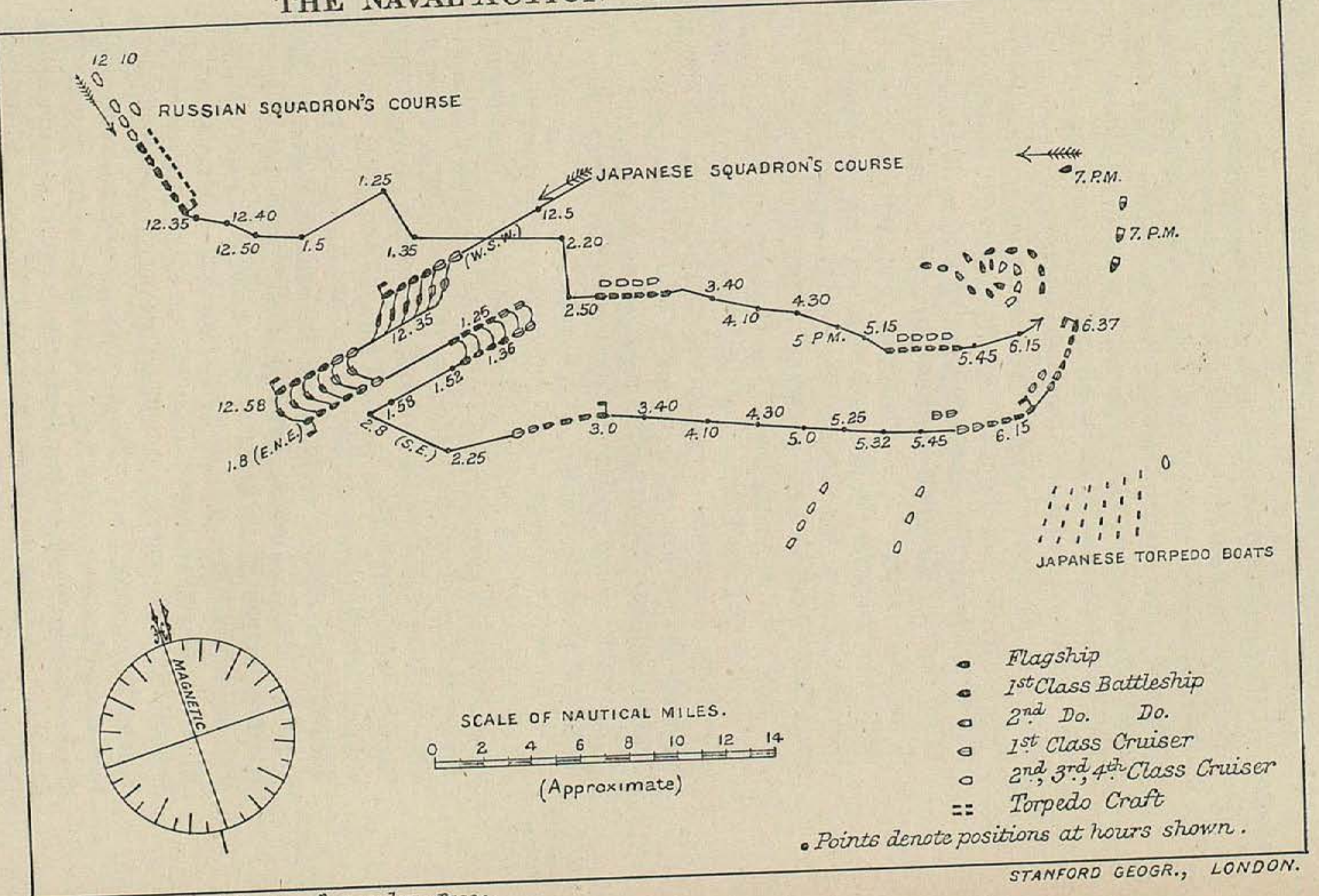
* She had carried Rear-Admiral Reitzenstein's flag in a sortie on July 27, in which the Retvizan, Pallada, Askold, Otvazin, Gremiastchi, and Giljak had taken part in order to cannonade the left wing of the Japanese Army besieging Port Arthur. The Novik with 12 torpedo craft went out at the same time to keep off the Japanese ships. In returning to Port Arthur the Bayan was damaged by a mine. A few days before, on July 24, the Russian destroyer, Lieut. Burukoff, formerly Chinese, was torpedoed by the Japanese, and after her crew had been removed she sank.

command made a general signal to make for Vladivostock. The work of searching for mines was necessarily slow, and the fleet took two hours in crossing the waters believed to be mined. At 10.15 a.m. the mine-dredgers accompanied by the sloops, gunboats, and second division of torpedo craft returned to Port Arthur; and the fleet proceeded at first at eight knots, afterwards at ten knots. By noon the speed had been increased to thirteen knots. Groups of Japanese ships and a large force of their torpedo craft were sighted in different quarters. Admiral Togo was assembling his force in order to engage the Russians. He had with him four battleships, viz., the Mikasa, Asahi, Fuji, and Shikishima; four armoured cruisers, the Nisshin, Kasuga, Yakumo, and Asuma; four smaller cruisers, the Chitose, Takasago, Kasagi, and Akashi, and a large number of torpedo craft. He also had at hand the Chin-yen, Itsukushima, Matsushima, Hashidate, and Chiyoda.

Opening of the action.

When the Russian Fleet was between 25 and 30 miles from Port Arthur shots were exchanged between the opposing forces at very long range. Fire was opened about 1 p.m., but seems to have been ineffectual on both sides. The two fleets had made repeated alterations of course with the general result that both were heading to the eastward, the Russians being to the northward and having the Japanese on their starboard hand, and these respective positions were generally maintained till near 6.30 p.m. There is an irreconcilable discrepancy between not only the Japanese and the Russian reports, but also between reports issued by the same side, as to the length of time that any phase of the engagement lasted. It may, however, be stated that the action which had been begun early in the afternoon was interrupted from about 3.30 p.m. till about 5.30 p.m. or 5.45 p.m. During the first part the ranges had varied from 11,000 to 8000 yards. The Russians, after the several alterations of course made by both fleets, finding the Japanese abaft their beam, believed that they had succeeded in breaking through their enemy's line, or rather past his force, and went on at high speed. The manœuvring of the Japanese Fleet had, perhaps, temporarily thrown it rather astern, or Admiral Togo had purposely steamed at a moderate rate in order that his several divisions might close each other so as to get into a more compact formation. Whatever may have been the reason, the Japanese did not remain long behind. At 5.30 p.m.—or, according to one account, at about 5.45—when he was 7500 yards from the Russian flagship and some 7800 yards from the sternmost Russian battleship, the Poltava, the latter again opened fire and started the second phase of the action. The unarmoured cruisers on both sides had taken their station on the unengaged beam of their own

THE NAVAL ACTION ON AUGUST 10TH., 1904.



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capital ships, the Russian cruisers being about 1750 yards from their friends.

Strength of the Squadrons.

The battle now took the form of a long-range engagement between the fleets, steering nearly the same course towards the East. The Russians were heading a little more to the southward than the Japanese. The latter are stated to have had in line eight ships, viz., four battleships and four armoured cruisers, two of these cruisers having come up just as the second phase of the engagement began. The second-class battleship Chin-yen, twenty-two years old, if she got into action on the Japanese side at all, could not have got up till towards the end. Omitting her from the account, the Japanese ships above-named had a broadside strength of sixteen 12-in. guns, one 10-in., fourteen 8-in., and fifty-three 6-in. The Russian line had on the broadside sixteen 12-in., eight 10-in., and thirty-six 6-in. Thus, whilst the 12-in. guns on both sides were equal, the Japanese opposed sixty-eight guns of less calibre to forty-four Russian. The Japanese pieces were distributed amongst eight, and the Russian amongst only six ships. Owing to the position in which the bow 6-inch gun was mounted in both the Pobieda and the Peresviet, the two pieces had a restricted arc of fire as regards the broadside, and it is probable that they did not bear on the enemy as long as the other pieces of the same calibre. What part the unarmoured Japanese cruisers took in the action is not known, but they appear to have fired on the Russians towards the end of it, if not earlier.

Death of Russian Admiral.

As far as it is possible to make the different reports of the action agree, it may be said that each side appeared to have begun by concentrating a large part of its fire on the leading ship of its opponent's line. The Japanese leading ship was Admiral Togo's flagship, the Mikasa, and the Russian leading ship was Admiral Vithöft's flagship, the Cesarevitch. At 5.56 p.m. a 12-in. shell struck one of the Mikasa's barbettes on the port side and burst. It jammed the turn-table, but this was speedily repaired and the guns were again in action. At 6.12 p.m. another large shell burst a little before the bridge on the port side. It caused many casualties, and of the eight persons on the bridge four, including the chief of the staff and the captain of the ship, were wounded. Admiral Togo was unhurt; but not without much difficulty the officers succeeded in persuading him to enter the conning tower. The Japanese now altered course more to port and the Russians did the same, though to a less degree. The distance between the fleets was thereby decreased. At a time which is variously reported, but probably about 6.15 p.m., a 12-in. shell, said to have been from the Mikasa, burst near the conning tower of the Cesarevitch, killing Admiral Vithöft and wounding the captain

of the ship. At the same time the Cesarevitch's steering gear was damaged, the helm jammed, and she made a sudden sheer to port. This threw the Russian line into confusion. The battleship immediately astern of the Cesarevitch followed her. The third and fourth ships in the line did the same, but nearly collided, obliging the fifth and sixth ships to steer out of the line. At the same time the Cesarevitch hoisted the signal that the command was transferred to the next senior officer, Rear-Admiral Prince Ukhtomsky, whose flag was carried by the Peresviet.

End of the action.

The Russian formation was now broken up, and the ships fell into a confused group at which the Japanese directed a hot fire at the comparatively short range of 3500 yards. At times the Russian ships were hidden by the smoke of exploding shells, and about 7 p.m. their fire slackened perceptibly. One report states that a second-class battleship and two coast-defence vessels had joined the Japanese, besides another ship of a class not certainly known. The whole twelve Japanese ships concentrated their fire on the six Russian battleships and four unarmoured cruisers till 8 p.m. Prince Ukhtomsky's flagship, the Peresviet, had lost many killed and wounded. The ordinary means of signalling, owing to injuries to the masts, were unavailable, and the ship's armament, hull, and electrical apparatus were seriously damaged. The Rear-Admiral thereupon displayed from the bridge the signal "Follow me." According to Rear-Admiral Reitzenstein's report from the Askold, which carried his flag, the plan for breaking through the Japanese Fleet had been arranged before the Russians left Port Arthur and was known to all the captains. The plan, apparently, was that each ship should make for Vladivostock; and it is nearly certain that the movements of the Vladivostock cruisers dealt with above were designed to help in its execution. Prince Ukhtomsky's signal to follow him superseded this plan, and the Retvizan, Sevastopol, Pobieda, Poltava, and the cruiser Pallada returned with the Peresviet to Port Arthur. They went at ordinary speed, but owing to repeated attacks, which obliged them from time to time to alter course in the darkness, the vessels proceeded to the port independently. All the torpedo attacks failed and the Russians were not pursued. Why the Japanese did not pursue is not yet known, though we may believe they had a good reason for not doing so. A slight haze coming on about sunset and hiding the Russian ships has been given as one reason. Another, and more probable reason, has been suggested. It is that the damage to the Mikasa—on which ship the Russians had concentrated a great part of their fire—was so serious that it was not desirable to leave her, and to have divided the Japanese

Fleet would have been to risk losing the considerable success already gained.

The supposition that the latter was the real reason derives some support from the fact that there was not haze enough to prevent the torpedo-craft from attacking the Russians, and from the experience of the Cesarevitch, which ship, as reported by Admiral Matzusevich, who was on board her, had some damage done to her engines and was obliged to stop for forty minutes, without any concerted attempt on the part of the Japanese to crush her.

Cesarevitch and Novik escape to Kiachow.

From nightfall the Cesarevitch, being unable to follow the rest of the Russian battleships, took a southerly course. She was attacked by torpedo-boats in the night, but unsuccessfully. She seems to have avoided these attacks by going at the highest speed that, in her condition, she could work up to. In consequence of damage to a funnel this necessitated a great consumption of coal, so depleting the stock in her bunkers that it was necessary to abandon the intention of proceeding to Vladivostock. She accordingly made for the neutral German port of Kiachow (Tsing-tau), where she arrived at 11 p.m. on August 11. The ship had to proceed generally at a rate of four knots. Her compasses had been rendered untrustworthy by the violent concussions of the firing, and her steering-gear was out of order. The Novik also reached Kiachow but little damaged, completed there with coal, and left again after a stay of ten hours. Her fate will be told hereafter.

Movements of cruisers.

When the main body of the Russian Fleet was seen to he retiring towards Port Arthur, Rear-Admiral Reitzenstein signalled to the cruiser squadron to follow him, having decided to break through the weakest spot in the Japanese line. He led the line of cruisers in the Askold. The Novik was next astern of him and, at some distance behind, were the Pallada and Diana. The Pallada eventually returned to Port Arthur, but the other cruisers kept on their course. Seven Japanese directed a hot fire against the Russians, who believed that amongst their opponents there was the Asama, which they set on fire and compelled to withdraw. It has, however, been stated that the Asama was not hit. It may have been the Yakumo, which cruiser had twelve killed. The Askold, which was short of two 6-in. guns, then came under the fire of the four Japanese battleships, and was attacked by four torpedo-boats. She claims to have sunk one of the boats with a 6-in. shell, and it is certain that the torpedoes failed to touch her. Some of them were seen to pass astern of the ship. The fight in which the Askold had now become involved lasted twenty minutes. The Japanese cruisers followed in pursuit of the Askold and Novik, but steaming at a speed of twenty

knots they rapidly drew away from their pursuers, the Novik, as already mentioned, being permitted to act independently. Two of the Askold's funnels had been in whole or in part shot away, and the uptakes of the foremost boilers were blocked, and the boilers had to be disconnected. This prevented her from steaming at her highest speed, and greatly increased her coal expenditure at the speed at which she did steam. She had fired during the day 200 6-in. shells and about 300 3-in. At 11 p.m. she was clear of her pursuers. She proceeded in the direction of Shanghai, and anchored at Wusung on August 12. She had one officer and ten men killed; four officers and forty-four men wounded, the wounds of twenty-nine of the latter being slight. The Askold had been five times in action. She was eventually disarmed and "interned" in the neutral port of Shanghai.

Last cruise of the Novik.

The Novik, which had arrived and coaled at Kiaochow, notwithstanding the heavy fire to which she had been subjected, appears to have escaped nearly, if not quite, unhurt. On leaving Kiaochow she made for Vladivostock, going through Van Diemen's Straits and eastward of the Japanese group of islands, in order to pass through the Soya or La Pérouse Straits between Hokkaido (Yezo) and Sakhalin. She was occasionally sighted and reported, and Japanese ships were told off to look after her. The Novik had been six times in action and had always been handled by her captain with a combination of gallantry and seaman-like ability, which won the cordial admiration of her enemies and of the officers of neutral navies. During the latter part of her voyage she had to steam against a head wind and heavy sea, and it is probable that her coal supply ran so low that it was not sufficient to carry her at a reasonably high speed to Vladivostock. She put into Aniwa Bay on August 20 and was found near Korsakovsk at 4 p.m. by the Tsushima which, together with the Chitose, had been sent to seek for her. The Tsushima sent a wireless signal to the Chitose and immediately attacked the Novik. The Japanese believed that they had hit her repeatedly and that she was on fire, and reported that at 5.40 p.m. she retreated to the inner anchorage. Nevertheless the Novik was not yet beaten. On the contrary, she beat off the Tsushima, notwithstanding the latter's superiority in force (six 6-in. guns against six 4·7-in.). Shortly after 6 p.m. the Tsushima was hit in her bunkers. She leaked badly and soon got a list, and was forced to withdraw out of range of the Novik's guns. At dawn the next day the Chitose approached Korsakovsk and anchored. She found that the Novik had been run ashore near the town and that her crew were abandoning her. She had apparently been set on fire as she was nearly enveloped in black smoke. The Chitose shelled

the stranded cruiser from 6.25 to 7.14 a.m. and then steamed to within 2600 yards of her when, being satisfied that the Novik was practically destroyed, the Japanese ship departed. No one was killed or wounded on board either the Tsushima or the Chitose. The Novik is said to have had two seamen killed.

Losses of *personnel* and effect of fire in certain ships in the action of August 10, 1904.

The unsuccessful attempt of the Russian Fleet to get away from Port Arthur really ended the naval campaign of 1904. Of the ships that got through the Japanese Fleet, one battleship, the Cesarevitch, and three destroyers were disarmed and interned at Kiachow (Tsingtau); one cruiser, the Askold, and one destroyer had the same fate at Shanghai, and another cruiser, the Novik, was destroyed, as has been seen, at Korsakovsk. A third cruiser, the Diana, was disarmed and interned at the neutral French port of Saigon. One destroyer had been seized at Chefoo by the Japanese for disregard of Chinese neutrality and one was wrecked on the coast of Shantung. The rest of the fleet which got back to Port Arthur remained there only to be destroyed in nearly every case by their own crews, to save them from the fate of being surrendered to their enemy on the fall of the fortress.

No detailed report of the Russian loss of officers and men on August 10 has been published, and only the aggregate number for the ships that returned to Port Arthur is known. The Cesarevitch had seven officers and ten men killed; nine officers and forty men wounded. On board the Askold, one officer and eleven men were killed; four officers and forty-four men were wounded. The Novik, as already mentioned, had two seamen killed. The Diana had one officer and nine men killed; sixteen men wounded. The aggregate loss of the ships which got back to Port Arthur was two officers and thirty-eight men killed; twenty-one officers and 286 men wounded. The grand total of the Russian loss in the six battleships and four cruisers amounted to eighty-one killed and 420 wounded, or 501 in all.

The official Japanese report gave the following figures: The Mikasa had four officers and twenty-eight men killed; ten officers and sixty-eight men wounded. No other Japanese battleship reported any loss. The Yakumo had one officer and eleven men killed; ten men wounded. The Nisshin's loss was seven officers and nine men killed; two officers and fifteen men were wounded. The Kasuga had ten men wounded. The destroyer Asagiri and torpedo No. 38 also suffered from the Russian fire, as the torpedo-boat had one man and one officer killed and seven men wounded, the destroyer's loss being one seaman wounded. No other loss having been reported amongst the torpedo craft, it would seem that the Russians were mistaken in believing that they had

sunk a Japanese torpedo-boat. The total Japanese loss, as reported at the time, was sixty-one killed and 124 wounded, or 185 in all. It was afterwards stated that the Chin-Yen and Idzumi were found to have suffered considerably, and that their losses brought up the Japanese loss to 225. Even if the last figure is admitted, the loss in proportion to the number of men engaged was not large. It may be mentioned that one British ship, the Colossus, had 200 officers and men killed at Trafalgar, and that at the Nile the Bellerophon's loss was 197 and the Majestic's 193. The complements of the Russian battleships and cruisers in action amounted to about 6250, and those of the Japanese vessels of all classes which took part in it exceeded that number. The British force at the battle of the Nile was 7400, and the loss it sustained amounted to 896. Again, on the same side at Trafalgar, with a total force of 16,500, the loss was 2931. The figures show that the sea-fights of the past were much more bloody than those of the present day.

Injuries to the Mikasa

The ship which seems to have suffered most heavily, both in *personnel* and *matériel* was the Mikasa. Her casualties amounted to 111, a number greatly exceeding that of any single Russian ship. What the damage done to the Mikasa's hull really was has not been reported, but her loss in killed and wounded was such that we may reasonably suppose that her hull was seriously damaged. No information concerning the injuries to other Japanese ships is available.

and the Cesarevitch.

We have detailed reports of the effect of the Japanese fire on the Cesarevitch, Askold, and Diana. Considering the length of time that the engagement in its various phases lasted, and the vivacity of the fire directed at the Russian ships, it is truly astonishing that they were not more often hit. The officers of the Cesarevitch stated that she had been hit by fifteen 12-in. projectiles and a much larger number of smaller ones. The latter may be soon dismissed from consideration. They did no serious damage to the ship or her fittings. The damage done even by the 12-in. projectiles which left unmistakable traces of impact was much less than would have been expected. Of hits by these, thirteen were counted; and there were two hits by 8-in. projectiles.

The thick armour of the Cesarevitch was rarely hit. The armour of each turret was once hit by a 12-in. projectile and no damage was done in either case. Three 12-in. projectiles damaged the funnels. One struck the starboard side of the ship below the fore turret, tore a hole about 3¼ ft. square in the side-plating, but caused "quite insignificant damage." Another projectile of the same calibre struck the starboard side just before the bower anchor

tilt-board, on a level with the upper deck; it tore a hole 6½ ft. square and cut through the bower and sheet cables,* but scarcely left any visible traces inside the ship. A 12-in. high-explosive shell blew to pieces the foremost chart-house. Another of the same description passed through the port railing and upper deck, tearing away half of a bollard. The teak planking of the deck was shattered for about 6½ ft. by 6½ ft.; the deck was not set on fire. The roof of the after turret, close to the sighting-hood, was struck by a high-explosive 12-in. shell; the top of the roof was slightly bulged; some rivets were sent flying and killed a man inside the turret. The man in the sighting-hood at the time was only stunned. A projectile, believed to be of 12-in. calibre, struck the starboard side below the foremost 6-in. gun turret about 7 ft. under water. The point of impact was on the joint between two plates. The plates, frames and butt-straps were bent but not torn. About 150 tons of water got into the ship through leaky rivets in the compartment behind the sloped armoured deck. The ship, however, had scarcely any perceptible list. A 12-in. projectile struck the starboard side of the conning tower, killed three officers and two men, and stunned two other officers. The helm was jammed hard-a-starboard by a man falling against it, but the rudder connections remained intact. It was this shot which caused the Cesarevitch to sheer and throw the Russian line into confusion. A 12-in. shell struck the foot of the foremast between the upper and lower bridges. The mast was much damaged but remained standing. This shot killed Rear-Admiral Vithöft. It also killed another officer and several men and wounded two officers, putting altogether nineteen persons *hors de combat*. An 8-in. shell passed through the port side of the super-structure and did some small damage to the boat-deck. Another 8-in. projectile passed through the port side of the front lower edge of the after 6-in. gun turret, making a hole 3 ft. by 1½ ft.

In most cases the Japanese shell produced scarcely any appreciable damage. In spite of wooden decks and of all the boats being inboard, the effect of splinters was very small, and the wooden decks were not set on fire. Fragments of shell fell down the after funnel and damaged some of the superheater tubes. The effect of the gases from the bursting of the high-explosive shells was serious. Many men who had received no direct wound suffered for twenty-four hours after the action from stupor, giddiness, loss of memory, and headache. The hair, beard, and sometimes the skin of those who were near such a shell when it burst were stained a deep yellow. The same colouring effect was also noticed on the parts of the ship near which the

* The two anchors were lost.

bursting occurred. The Cesarevitch fired seventy-four or seventy-five rounds from the fore-turret, forty to forty-five rounds from the after turret, and from 580 to 600 from the 6-in. guns.

Injuries to the Askold.

The condition in which the Askold emerged from the fight deserves attention. In the earlier part of the action, when the cruisers were but little engaged, she was hit twice. A 12-in. shell, believed to have been fired by the Skikishima, burst close above the upper deck near the foremost funnel. It killed the officer who was working the rangefinder on the starboard side of the bridge, which was shattered. The lower plates of the funnel were torn. This led to the blocking up of the uptakes of the foremost boilers, which had to be disconnected as already mentioned. A shot on ricochet passed through the outer skin about 4½ feet above water, and ignited some ready 3-in. Q.F. ammunition. The fire burnt itself out without any damage. It may be observed that of the fires which occurred on board Russian ships in action, more than one were due to the ignition of their own ammunition where it had been allowed to accumulate ready for the supply of the guns. In the latter part of the fight, when the Askold broke through the Japanese Fleet, she is stated to have been exposed to the concentrated fire of seven Japanese ships—principally unarmoured cruisers, but one cruiser of the Asama type most likely the Yakumo, was amongst them. The Askold closed in the hope of being able to discharge a torpedo at the Japanese armoured cruiser. Either the chance did not occur, or the torpedo missed, for, if discharged at all, it did no harm. The people on board the Askold believed that they inflicted some damage on three Japanese cruisers, and caused a fire to break out on board the armoured cruiser (? Yakumo), compelling her to retire. The Yakumo, it may be remarked, had a larger number killed and wounded than any other Japanese ship except the Mikasa and Nisshin, and her number of killed was the same as the number killed on board the Askold.

That ship, in this latter part of the battle, was hit, mostly abaft the beam, by shot on ricochet, by fourteen large and a great number of smaller projectiles and fragments of shells. Two of her funnels were shot away. Her boats were riddled by small shot and flying fragments and were rendered unserviceable. A heavy shell made a hole about a foot square in the breastwork of the upper deck, but the explosive effect was slight. About five 8-in. and three 6-in. shell hit her, besides two small-calibre, probably 3-in., shell, which did visible damage, one having gone through the upper deck, and burst in a cabin, whilst the other put a shot-hoist out of action. The other striking shots of which the effects could be traced were believed to be

of large calibre. A 6-in. shot struck the ship near the water-line but its explosive effect was small, and it was specially noted that the armoured deck was uninjured. An 8-in. shell struck her exactly on the water-line, and tore a hole about 2½ feet square in the outer skin, but did no further mischief. At least three 8-in. shell made holes in the ship's side, and wrecked officers' cabins. In one case an insignificant fire was started. When she arrived at Shanghai the Askold was found to be without her two midship 6-in. guns. She had been five times in action, and each of her 6-in. guns had been damaged, but were replaced by others before August 10. The absence of two guns above mentioned may have been due to an insufficient reserve at Port Arthur to replace damaged pieces, or because guns had been landed from the Russian Fleet to supplement the armament of the land defences. It is to be noted that no 6-in. gun-shield was perforated or considerably bent. The Askold, during the whole action, fired 200 6-in. and 300 3-in. Q.F. shells.

Diana's injuries.

The Diana had her funnels, ventilators, bulwarks, and hammock-nettings perforated in several places, but of serious injuries affecting the ship's safety, she received only one. This was a blow from a large projectile, making, below the water-line, a hole, which was temporarily stopped up. She was hit by this shot towards the end of the action. The quantity of water that got into the ship was not large, and did not immerse her more than if she had had all her coal on board.

Notes on the action of August 10, 1904.

In this action, as in every other, except that in which the destroyer, Steregustchi, was reduced to a sinking condition, no vessel on either side was sunk by gun-fire. The Varyag and the Rurik were sent to the bottom by their own people, who let water into them for the purpose of making them go down. Not only did very few shot—in the case of Russian ships—hit thick armour, but also, of those that did, most hit parts of the armour that protected the armament and not the buoyancy of the ship. The case of the Cesarevitch, as that of the Pobieda, on a former occasion, and probably that of several of the battleships that returned to Port Arthur on August 10, showed that a battleship can be defeated or altogether put out of action, even if her thick armour is rarely or never touched by a projectile. The relatively small amount of damage done to the unarmoured Askold, which ship was subjected to a heavy fire, sustained for at least twenty minutes, and the unarmoured Diana deserves consideration. It repeats the experience of the unarmoured Naniwa and Takachiho, the ships that completed the defeat of the Rurik. It does not show that thick protective armour is useless, but it does show that it is possible to attach too great importance to it. In fact,

it raises in an impressive form the question as to the respective predominance to be given to the defensive and to the offensive characteristics of a fighting ship. Is a ship to be a fort; an impenetrable shelter behind the armour of which her crew will feel invulnerable, or is she to be a weapon to be used with vigour against the enemy? This is what the question really comes to, and it is in this form that it ought to be considered.

If, as it almost certainly was, the Russian plan on August 10 to break out of Port Arthur, pick up the Gromoboi and her consorts, and proceed to Vladivostock, it was strategically sound. The fate which afterwards befell Port Arthur, must have been thought possible by the Russian Admiral, perhaps was regarded by him as inevitable; and assembling his forces at Vladivostock would have been the right course to take, and, indeed, was the only one open to him, if he wanted to save his fleet from the Port Arthur entanglement. Had the Cesarevitch taken station anywhere in her line but at the head of it, where, as flagship of the Commander-in-Chief, she drew the enemy's concentrated fire on herself, the plan might have been successful, at least as regards many of the Russian ships. As soon as Admiral Vithöft's directing hand disappeared, the sinister influence, which the proximity of a "port of refuge" is always likely to exercise, made itself felt by those who were suddenly confronted with a serious situation and the unexpected burden of responsibility.

During the latest part of the action of August 10 the Russian ships, their line being thrown into confusion, got huddled together, and the Japanese, in comparatively good order, circled round them. The Russian guns were thus concentrated and their fire dispersed. This occasioned the least effective use to which guns can be put. The Japanese, on the other hand, had their ships dispersed along a line of considerable length, and concentrated their fire on the huddled mass of Russian ships. This gave the Japanese the advantage of dispersed guns and converged or concentrated fire. The damage to the Mikasa seems to have been grave enough to render it desirable for Admiral Togo to keep his fleet together; thus there was practically no pursuit either of the ships retreating to Port Arthur or of those that were making for the Shantung promontory.

The necessity of being ready to proceed at high speed, and of proceeding at it from time to time, occasioned a heavy consumption of coal by the Russians. This, added to the increased consumption due to injuries in funnels and boilers, reduced their stock of coal so considerably that to reach Vladivostock it would have been necessary to steam at only a moderate rate. It is doubtful if this condition of

things would have facilitated pursuit; for the Japanese must have been affected in nearly the same way.

Torpedo attack on the Sevastopol.

The action of August 10 was essentially a straggling fight, but it practically ended the naval campaign of 1904. The Sevastopol again struck a mine during operations outside Port Arthur on September 20. The injury was in the same place, but the hole was nearly twice the size of that made on June 23. The damage was made good in two and a half months. It is not necessary to consider in detail the naval movements made afterwards until we reach the end of November. The Japanese Army besieging Port Arthur had now captured positions from which they could cannonade with effect the Russian ships crowded in the harbours. In the early part of December the Russians sank their capital ships, which had been already damaged by hostile fire, with the exception of the Sevastopol, which on the morning of December 9 moved outside the harbour and took refuge under Cheng-ten-shan to avoid the fire of the Japanese shore guns. Here the helpless and already injured Russian battleship was attacked by Japanese torpedo craft on December 9, 13, 14, 15, and 16. A report, attributed to Captain Esen, who commanded the ship, states that her nets were placed in position, but only one hundred men were left on board, and all her small Q.F. guns were landed. The Japanese torpedo-boats steamed past under a heavy fire from the forts at a range of about 1200 yards, discharging their torpedoes, which mostly exploded in the nets, and firing their guns. After many failures, a torpedo was at last got home near the stem during a blinding snowstorm and heavy sea. On the following day her captain took her out under her own steam and sank her in deep water. The Japanese torpedo-boat officers again showed great power of endurance, for the weather was bitterly cold. There were no attempts on the part of the Russians to frustrate the attacks by means of an offensive defence with destroyers. The fact that a ship in a known position, and in the state in which she was, could stand out against repeated torpedo-boat attacks on several different days must be taken as establishing the limited efficiency of that form of assault. Why the ship was torpedoed at all is not clear. She could not escape, and it was certain either that she would be destroyed by her own crew or be surrendered when Port Arthur fell.

Russian losses in ships.

Port Arthur surrendered on January 2, 1905. The Russian Far-Eastern Fleet ceased to exist. The Gromoboi, the defects of which ship after the action of August 14 had been repaired, had gone ashore whilst on a short cruise, and had been so seriously damaged that she was no longer efficient; and the Rossia, shut up in Vladi-

vostock, alone remained, and even her fitness for sea is doubted. The fate of the Russian fighting ships is given in the following list:

Battleships	Cesarevitch	Interned at Kia-chow.
	Retvizan*	Sunk at Port Arthur.
	Pobieda*	" "
	Peresviet*	" "
	Petropavlovsk	Sunk by a mine.
	Poltava*	Sunk at Port Arthur.
	Sevastopol	Sunk outside Port Arthur.
Armoured Cruisers	Bayan*	Sunk at Port Arthur.
	Gromoboi	Unserviceable, at Vladivostock.
	Rossia	At Vladivostock.
	Rurik	Sunk, August 14, 1904.
Cruisers	Bogatyr	Badly damaged, Vladivostock.
	Askold	Interned at Shanghai.
	Varyag	Sunk at Chemulpho.
	Diana	Interned at Saigon.
	Pallada*	Sunk at Port Arthur.
	Novik	Destroyed, August 28, 1904.
	Boyarin	Sunk, February 12, 1904.
Armoured Gunboats	Gremiastchy	(?) Sunk at Port Arthur.
	Otvazni	Sunk by a mine, August 8, 1804.
Sloops	Gilyak	Unserviceable, at Port Arthur.
	Djigit	" "
	Razboynik	" "
	Zabiyaka	" "
	Korieits	Sunk at Chemulpho.
	Mandjur	Interned at Shanghai.
Gunboats	Bobr	Unserviceable at Port Arthur.
	Sivootch	Destroyed in Liao River.

Of twenty-five Russian destroyers, ten remain, viz., Smely, Boiki, Bespochtchadni, Beschumni, Bestrachni, interned at Kiao-chow, Grozovoi, interned at Shanghai, and Skory, Stratni, Serdity, Vlastni, interned at Chefu.

If we exclude the Yashima, which ship, however, was seriously injured if not sunk by a mine, the Japanese lost the following ships:— Japanese losses in ships.

Battleship	Hatsuse	Sunk by a mine.
Coast-defence ship	Heiyen	" "
Cruiser	Yoshino	Sunk by collision.
	Sai-Yen	Sunk by a mine.
	Miyako	Sunk by collision (raised again).
	Kaimon	" "

The following losses amongst the *personnel* of the Japanese have been reported. From February till December 5, 1904, the total number of casualties was 2492. The following table gives the details:— Total Japanese losses in *personnel*.

	Killed.	Deaths from Wounds.	Wounded.	Total.
Officers	127	8	85	220
Warrant officers	33	3	23	59
Bluejackets	1303	56	854	2213

Of the above number some 280 officers and men were killed during the operations on land, from August last to November 30,

* Advices from Port Arthur state that the Poltava, Peresviet, Pallada, and possibly Bayan may be saved; but that the condition of Retvizan is certainly, and Pobieda probably, beyond repair.

these men belonging to the naval force attached to the army investing Port Arthur. The high proportion of killed is due to the losses in ships sunk by mines.

Position of the Russian naval reinforcement from Europe.

The reinforcement of the Russian Fleet expected from Europe began to leave Libau, in the Baltic, on October 15, 1904. Other detachments left at later dates. It is not necessary to deal with the history of the reinforcement in this chapter. All that need be said of it here is that in the middle of March the Second Pacific Squadron was still on the western side of the Indian Ocean. It consisted of the following ships:—

SECOND PACIFIC SQUADRON.

Battleships	Kniaz Souvaroff (flag of C.-in-C.). Orel. Imperator Alexander III. Borodino. Oslabya. Sissoi Veliky (flag of 2nd in command). Navarin.
Armoured Cruisers	Admiral Nakhimoff. Dmitri Donskoi.
Protected Cruisers	Aurora. Oleg. Izumrud. Jemtchug. Svietlana.
Despatch Vessel	Almaz (flag of 3rd in command).
Destroyers	Gromki, Grozni, Bodry, Bezumprechni, Blestiaschy, Buistni, Bedovi, Burni, and Bravi.
Auxiliary Cruisers	Kuban, Ural, Terek, Rion, Dnieper, and Irtuish.
Repair Ship	Kamchatka.
Volunteer Fleet Ships	Vladimir, Yaroslav, Voronej, Kiev, and Tamboff.

Seven Transports and a Hospital Ship.

The Third Pacific Squadron left Suda Bay for Port Said on March 21, and consists of the following ships:—

Battleship, 2nd class	Imperator Nikolai I. (flag).
Battleships, 3rd class	General Admiral Apraxine. Admiral Oushakoff. Admiral Seniavin.
Cruiser, 1st class, Armoured	Vladimir Monomach.
Destroyers	Prontsiteliny, Prosorlivy, and Ryezvi.

Three Transports, a Tank Vessel, a Repair Ship, and a Hospital Ship.

The following extracts (received after going to press) are from a letter from the *Times* correspondent with the Japanese army before Port Arthur, published on March 18, 1905, give further information as to the state of things actually observed at the place after its surrender.

With respect to the attempt by the Japanese to block the port, the writer says:—"It is perfectly certain that the vessels sank and the lives lost in carrying out the project were thrown away, for the

ships were certain to be sunk too far out to block the mouth of the harbour, and even if this were done it would have been a matter of a day to blow up the obstruction."

Speaking of the action of August 10, 1904, the correspondent tells us that the Retvizan, which had received the concentrated fire of the Japanese Fleet, "does not seem to have been damaged in any vital spot during the engagement, nor were any of her guns put out of action, though one of her turrets was damaged." Her injuries were apparently confined to riddling of her funnels and destruction of her superstructure and bridge.

The correspondent also informs us that the Japanese have abandoned the attempt to raise the Varyag at Chemulpho.

Comments on the Campaign.

The naval operations of the campaign of 1904 in the Far East, of which only an imperfect account is possible, have been interesting. They suggest some reflections; perhaps point to some conclusions. The Japanese began the war with a naval force, if numbers alone are considered, insufficient for so great an undertaking. The Russian Fleet in the Far East was really only a detachment of the whole Russian Navy, and it was to be expected, would be promptly reinforced. The Japanese Fleet was not greatly its superior. It is evident that the Japanese had done what every people likely to be forced into war ought to do. They had carefully considered every condition. We may therefore be sure that they had satisfied themselves of their antagonist's unreadiness, and felt confident that there would be time to deal effectively with the Russian Fleet in their neighbourhood before another could come to its assistance. In doing this they took risks, but of a kind not dissimilar from the risk incurred by an inferior fleet when it concentrates the greater part of its strength on part of its enemy's line. It was this which was done at St. Vincent and Trafalgar. The assumption in those battles—and it was justified by the result—was that the unengaged part of the enemy's force would not, or could not, come to the assistance of its hard-pressed consorts before they had been defeated. Unthinking audacity in war is foolish, if not criminal; calculated audacity is amongst the highest war-like qualities. It is a quality of which the Japanese, in the campaign of 1904, have given us many examples. Comments on the naval campaign of 1904.

Perhaps nothing stands out more clearly in the campaign than the insignificance of the results effected by the locomotive torpedo. The many torpedo-craft of the Russians did not discharge one torpedo amongst them. Their ships discharged several, but not one took General inefficiency of the torpedo.

effect. The special conditions, so unlikely to be repeated, in which the torpedo attack was made on the Russian ships in the night on February 8 and 9, 1904, have already been alluded to. Even as things were, the result of the attack was disappointing. It is true that the destroyer, Lieutenant Burukoff, was reduced to a sinking state by a Japanese torpedo, and it is the single case in which the many attacks made on effective fighting vessels succeeded; and the fighting vessel which eventually sank after being torpedoed was—it should be noted—a small destroyer. The case of the Sevastopol shows that to destroy even an injured or water-logged ship in a fixed position a great many torpedo attacks are necessary. We are not to conclude that the locomotive torpedo is useless and a thing to be discarded entirely from naval equipment. The conclusion should be that it is a weapon of limited efficiency; to be depended on only in special circumstances of infrequent occurrence. To found on it a system of tactics, a plan of campaign, or even a type of ship design would be paralleled by founding a system of artillery tactics on the probable employment of the sabres carried by the gunners. It is not too much to say that experience of the late campaign, confirming as it does the arguments of students of tactics in these days of long-range guns, justifies a demand that torpedoes should be withdrawn from the armament of cruisers and battleships.

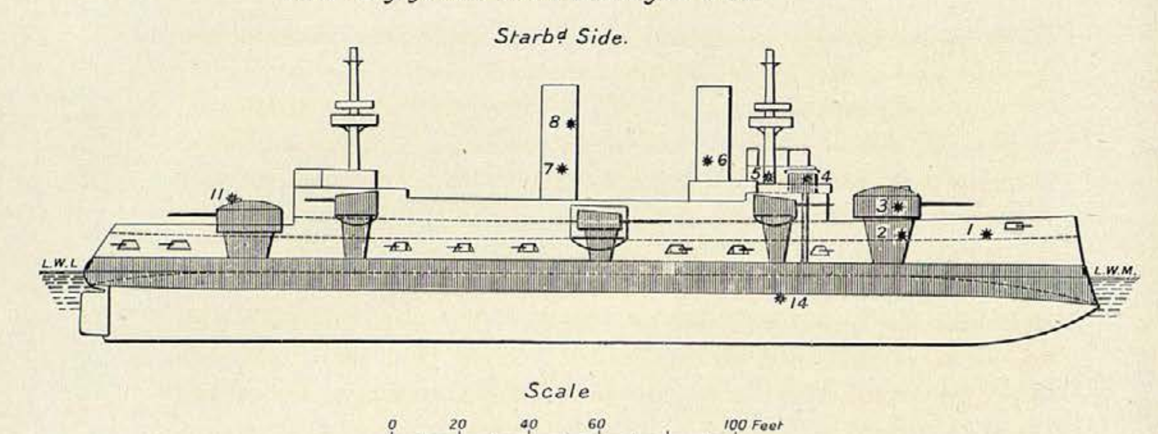
Reflections on submarine boats.

It was repeatedly reported in newspapers that both Russians and Japanese had obtained submarine boats. There was, on the other hand, no sign of boats of the kind having been ever used. What they could have done, seeing how little ordinary torpedo craft succeeded in effecting, cannot be perceived. The low speed of submarine boats and the difficulty or impossibility of seeing the object from a boat when submerged constitute a high price to pay for their invisibility, which is superior to the concealment of an ordinary torpedo-boat at night by only a moderate margin. The company of a flotilla of submarines would have hampered greatly the movements of the fleet, even when every inlet in the coast from Mokpho to Dalny was open to them. Had much of the coast been in the hands of neutral powers, as it would be were the theatre of war in European waters, few inlets would be open to a belligerent's submarines; and their company would probably be found intolerable by a cruising fleet. Full consideration of the conditions revealed by the present war is likely to lead to the conclusion that the adoption of the submarine is no sign of naval progress, but is on the contrary a retrograde step. The adoption may be ascribed to the mischievous influence which mechanical contrivances of indisputable ingenuity and equally indisputable complexity possesses at a time in which we

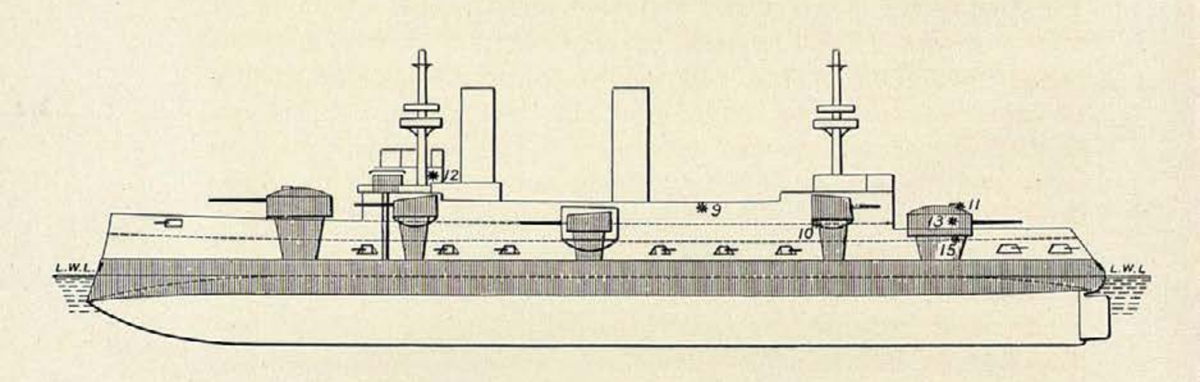
Cesarevitch.

Sketches showing in ✱ damage sustained in the Naval Engagement on the 10th August 1904.

Starbd Side.



Port Side



Varyag

After the Action off Chemulpo 9 Feb: 1904.

A — Killed two men in top wounded the third
F — " one man " " " other two.
B — Burst outside the conning tower wounded the captain slightly, killed his bugler and orderly.
C — Killed all but one man out of the two ford 6" guns crews
D — Collision mat was put over this hole.
E — Set fire to several charges (6"), which burnt with great fury.
G — Set fire to captains cabin and to a tank of flour under it this fire was burning when she sank.

C
6" or 8" shell
A
small shell
B
6" shell
6" or 8" shell
6" or 8" shell
F
small shell
shell
12 Pr Shell Starb. side
E
8" shell
small holes
12 Pr Shell
G Starb. side
D
3 holes below water

To face page 169.

are more accustomed to consider material appliances than human faculties and strategic conditions.

Ram never used.

It is significant that not only was no attempt made by either side to use the ram in action, but also attack with the ram was never mentioned in connection with any engagement in this campaign, or even seriously thought of. It will be interesting to see how long the ram-bow will continue to be a feature of war-ship design.

Long range fighting.

It was certain that sooner or later the adoption of guns firing shot with flat trajectories and long range—that is to say, guns with which there is every probability of hitting the mark at great distances—would lead to battles being fought at ranges far greater than those hitherto known. The operations in the late campaign show that the time for this has come. This supports the view that the torpedo should no longer form part of the armament of big ships. The rarity of hits on the hulls of ships engaged was remarkable. The Varyag, the Cesarevitch, the Askold, and the Diana were hit by fifteen or sixteen shot or less. As has been said before, the thick armour was rarely touched. In the cases which it has been possible to investigate, the great majority of hits were above a line drawn only a foot or two below the upper deck. This is not surprising, as masts and funnels and other elevated prominences naturally attract the aimer's eye. Giving guns high command would therefore seem to increase their liability to be hit. If this be so, the height at which guns shall be mounted above the water line requires special consideration.

Is the big armoured cruiser a justifiable type?

There is little evidence as to the defensive value of casemates. The men in the Gromoboi's armoured casemates were untouched, though some of her guns in them were disabled. In the unarmoured Askold, as has been observed already, no 6-in. gun-shield was perforated or considerably bent. The Gromoboi's 6-in. gun casemates are stated in last year's *Naval Annual* to be $4\frac{3}{4}$ in. thick, and the shields of the Askold to be 4 in. If we hold to the view, which cannot be called altogether unreasonable, that cruisers are intended to be cruisers, and not ships for fighting in general actions or forming part of "the line of battle," we may be disposed to ask if two Askolds, with a united displacement of 11,110 tons, would not have been more useful to the Russian Fleet in the campaign of 1904 than the Gromoboi, displacing 12,336 tons. A true conception of cruiser tactics indicates that multiplicity rather than a small number of powerful individual ships would be needed. The operations of the late campaign suggest a question as to the utility of the big armoured cruiser. Is there any justification for the existence of the type? It would be bold to maintain that two Regina Elenas of nearly identical displacement (24,850 tons against

24,466 tons), of heavier armament, of superior defensive armour, of equal coal endurance, and of higher speed, would not have been more useful than the Gromoboi and the Rossia. Is not the adoption of the big armoured cruiser an unconscious admission that battleships of more moderate dimensions than those of the "first class" are necessary? The admission seems to take this form: "You may build a moderate-sized battleship if you like, but she must have certain inherent defects, and must be called a cruiser." Manipulation of names may help a policy in time of peace: to rely upon it in war would be to seek for disaster. As regards design of bow and capacity for steaming against a head sea, in which the battleship type may be inferior to the cruiser type, it may be said that the Askold showed no inferiority in those particulars to the Gromoboi or to the Japanese armoured cruisers.

Practical justification of the battleship.

The battleship as a type has eminently justified her existence in this campaign. As suggested above, it was Admiral Togo's battle fleet, not his torpedo craft, not the sunken steamers, not the Japanese blockade mines, which really confined the Russians to Port Arthur. When they did come out it was not to fight a decisive action, but to return or try to break through their enemy's encircling force.

Facilities gained by use of flying bases.

The ease with which the Japanese shifted their base nearer to their objective is worthy of serious notice. That ease in shifting should be contrasted with the difficulty experienced by the Russian ships in getting away from their great coast fortress, the strong defences of which could not save it in the end. Yet Port Arthur with its dockyard and magazines of stores and also some part at any rate of the place's fortifications were necessary. There was mistaken use of it no doubt, and the mistake lay in making it the pivot on which the campaign turned. The fate of Port Arthur supplied another proof of the danger of believing that command of the sea can be secured or made to rest upon passive defences on land. A fortified port—if an enemy who has command of the sea is determined to take it—is captured "by the back door"—that is to say, it falls in a siege by a land army.

Small tactical and strategical value of speed.

People who expected to find in the operations of the 1904 campaign any proof of the value of a superiority in speed will be disappointed. That no great value as a factor in general tactics could be assigned to speed superiority had long been suspected by officers who had made a close study of tactical questions. In the domain of strategy as distinguished from tactics the value of higher speed than your adversary's was thought likely to be considerable. Even in the strategical domain this expectation has been only partially fulfilled. The superior speed of the Asahi (18 knots), the Mikasa (18·6), the Fuji (19·2), and the Shikishima (18·5) did not enable them on

August 10, 1905, to prevent the escape of the Sevastopol (17·5 knots) or the return to Port Arthur of the Poltava (16·2). Notwithstanding the superior speed of the Idzumo (21·0 knots), the Iwate (21·8) and the Tokiwa (23·0), the Gromoboi (20·0) and the Rossia (20·0) escaped from them in a running fight on August 14. On the other hand the Novik's great speed of 25·0 knots did not save her from destruction when followed up by the slower Chitose (22·5 knots) and the much slower Tsushima (20·0). The escape of the Askold (23·8 knots), as will be seen by a reference to the account of her proceedings given above, was not due to the maintenance on her part of superior speed, because, owing to the injuries to her funnels, high speed could not be kept up.

The reasons of the disappointment of the expectations formed concerning superior speed have been in part disclosed by the incidents of the late campaign. We see now that many things which will neutralise it are likely to happen. The faculty of proceeding at a speed superior to that of your adversary may remain unimpaired, and yet—as were Vice-Admiral Kamimura's cruisers on August 14—you may be unable to take advantage of it. The necessity of husbanding her coal-supply may compel, indeed is very likely to compel, a 25-knot Novik to proceed, as that ship had to do, at a moderate rate. A fast ship may find that she cannot put forward her utmost speed because of injuries to her funnels or because she has been obliged to disconnect some of her boilers. We should not hastily draw conclusions concerning speed. What we ought to do is to remember that it is only one of the various elements of fighting efficiency. A ship of war is intended primarily to fight and not to run away. We should therefore be careful not to give to any other element undue predominance over the element of offensive power in the design of a ship meant to be capable of destroying or defeating her antagonist. In ships for fighting general actions—that is, ships for fighting in combination with consorts—the element of offensive power in any individual should bear the proper relation to the aggregate of that power in the whole group. Suitable dispersion should be given to the instruments of offensive power, and allowance should be made for suitable concentration of their effect. For certain classes of vessels, which usually will be of small size, very high speed, greater than that of an antagonist if possible, should be provided; but it must be understood that these vessels can play only a special and restricted part in war.

Importance of moral qualities in war.

Once more we have been taught the extreme importance of the moral qualities in war. In the late campaign, allowing for the arrival of reinforcements for the Russians, the two sides were not

conspicuously unequal. In number of battleships, as we know, the Russian side was superior on the spot. In construction and equipment of individual ships there seems to have been an exact equality. The long-service system of one side may be taken as having gone far towards neutralising any advantage derived by the other from better methods of training. How can we account for the great discrepancy in the performances of the respective combatants? Only by comparing the moral qualities of one with those of the other. The term, as used here, covers all qualities except the physical characteristics of stature, strength, agility, and health. Omitting some individual instances, the Russians were decidedly inferior, intellectually, to the Japanese, and this was especially marked amongst the 'foremast hands. The Japanese are endowed with a mental alertness surpassed by that of no people in the world. Readiness of resource and promptness of adaptation to changed conditions were as evident in the Japanese Navy as the absence of them was in the Russian. The valour of one side was not surpassed by that of the other, but the respective manifestations of it differed greatly. On the Russian side it took the more passive form of unflinching fortitude; on the Japanese it manifested itself as heroic but calculated audacity. It is certain that the latter is the more valuable to a navy. When the Russians desisted from an operation, or abandoned some course on which they had entered, the decision in either case was based on no discoverable rational ground. When the Japanese stopped in the middle of what looked like a promising affair, they always had a good reason for stopping—ships must not be risked too incautiously whilst reinforcements were preparing to join their enemy; ammunition must not be allowed to run quite out; some other operation must not be spoiled by precipitancy. Their action was made possible by their possession of the quality of self-restraint in the midst of exciting circumstances. The individual Russian knew little of the circumstances which had produced the war, and had little interest in the struggle. The humblest Japanese knew what had been done to his country in 1895 about Port Arthur, and was pervaded by the feeling that his countrymen were fighting for national existence. Add to this a feeling of intense loyalty and patriotism which supplies the place of a deeply revered religion and the spirit which the Japanese brought to the prosecution of the war can be understood. A nation actuated by such a spirit goes into a war with a prospect of success that nothing else can give. Is the spirit likely to be produced or fostered in the lecture-rooms and drill-grounds which some navies at the present day are so fond of substituting for practical experience of blue water?

CYPRIAN A. G. BRIDGE.

CHAPTER VIII.

The Manning of the Navy and Mercantile Marine.

I.—The Manning of the Royal Navy.

In 1904 the numbers on active service of the leading Powers were given in the *Naval Annual* as under: Great Britain, officers, 8529; men, 122,862 (including marines, 19,873). France, officers, 2982; men, 49,984. Germany, officers, 1871; men, 33,963.

The table in the Navy Estimates for 1904–5 shows the increase in numbers and expenditure for the years 1895–96 to 1904–5:—

Date.	Nos.	Vote. Wages.	Vote. Victualling and Clothing.	Total.
1895–96	85,903	£4,059,000	£1,396,000	£5,455,000
1904–05	131,000	£6,691,000	£2,428,000	£9,119,000
Increase	45,097	£2,632,000	£1,032,000	£3,664,000

The increase in the manning votes of foreign Powers has been inconsiderable in comparision with the large additions to British Navy Estimates. We see a wise change of policy in the Estimates for 1905–6. After many years of ever-increasing numbers a reduction in the permanent force is proposed. The numbers for 1905–6 are 129,000, being 2100 less than for the preceding year. This reduction, as it is explained in the First Lord's Memorandum, is consequential on the policy of eliminating from the Navy as many ships as possible of unprotected types, no longer effective in time of war. Comparing the Estimates for 1905–6 with those of the previous year, the reduction in numbers has permitted a decrease of £19,000 in the wages vote and £171,400 in the vote for victualling and clothing.

Numbers of Reserves.

In previous papers contributed to the *Naval Annual* it has been our duty to charge the Admiralty with neglect of the Reserves, while adding beyond the necessity to the permanent force. The increase in ten years for the pay and victualling of the permanent force aggregated £3,664,000. In the same period the vote for the Reserves increased from £203,701 to £404,500. It is fitting to acknowledge that the neglect of the past is no longer seen. All branches of the

Reserves have been increased and new forces have been enrolled. The Reserves of the Navy, to be voted for 1905–6, are distributed as under:—

ROYAL NAVAL RESERVE.

			1905–1906.	
Officers (including twenty-five for R.N.R., Australia)			2,205	
Men	Leading Seamen	200	29,600	
	Qualified Seamen and First-class (old system)	18,000		
	Seamen and Second-class (old system)	9,000		
	Engine-room Artificers	600		
	Firemen	5,800		
	Stokers	1,000		
Royal Naval Reserve, Newfoundland			600	
" " Malta			400	
" " Australasia (Men)			700	
Royal Naval Volunteers (Efficients)			3,600	
				37,105

ROYAL FLEET RESERVE (*a*).

Men	Class A. Pensioners	Seamen and Stoker classes	6,350	8,100	
		Police ratings	100		
		Royal Marines	1,650		
	Class B. Non-Pensioners	Seamen and Stoker classes	6,480	8,500	
		Police ratings	20		
		Royal Marines	2,000		
	Class C. Non-Pensioners—Artisans			—	
					16,600

PENSIONERS.

Seamen	(*b*) 4,110	
Royal Marines	(*c*) 1,190	5,300
Total		59,005
Total—Vote A	129,000	
Total Salary Half-pay, and Reserves	59,422	
Grand Total		188,422

(*a*) This Reserve was established March 1, 1901; the numbers are an estimate of the strength that it is anticipated will be attained in 1905–6, and include 1900 men of the Seamen Pensioner Reserve.

(*b*) This number includes all Long Service Pensioners under fifty-five years of age, viz., 11,544, after deducting 6450, the estimated number in Class A of the Royal Fleet Reserve, and 984 serving in Home ships, etc.

(*c*) This number includes all Long Service Pensioners under fifty-five years of age, viz., 2840, after deducting 1650, the estimated number in Class A of the Royal Naval Reserve.

Fleet Reserve.

The men who have served in the Fleet must always be the best reservists for the Navy. It is gratifying to know that the Royal Fleet Reserve is rapidly growing. The numbers in the non-pensioner class, men in the prime of life, will be increased in the ensuing financial year from 6500 to 8500.

Naval Reserve.

Under the head of Royal Naval Reserve are included the officers and men drawn from the Mercantile Marine and the fishing industry. As regards officers, the numbers borne on December 1, 1904 (1586) were nearly up to the numbers voted for the year (1600). In

addition there were 242 qualified candidates on the list of applicants for entry. Three hundred and sixty-six officers of the Naval Reserve have already undergone training in the Navy, and are in receipt of training fees, while of 352 engineer officers 132 have completed or are undergoing courses. As regards the men, the institution of the sea drill-ships and the better conditions of training have greatly assisted recruiting. The numbers borne at December 31 have increased from 24,648 in 1902 to 26,048 in 1903 and 29,538 in 1904—an increase of 4500 men in two years. No less than 2362 qualified seamen and seamen embarked for training in H.M. ships in 1904 as compared with 1522 in the previous year. In the engine-room complements the numbers embarked included 428 E.R.A.'s and 710 special firemen.

Colonial Naval Reserve.

Among the new forces none are more valuable than the reserves now being raised for the Navy in Newfoundland and Australasia. In November last the numbers already recruited were: Australia, 148; Newfoundland, 511; Malta, 344; total, 1003. In the *Naval Annual* of 1898 (p. 114) it is stated that the seamen and fishermen of Canada (including persons so familiar with the sea as to be at home upon it) number 70,000, while those of Newfoundland are said to number 55,000. The figures for Canada would include some 12,000 men engaged for a part of the year only in the salmon fishings of British Columbia. We may take the seafaring men of Australasia at 20,000. There are, therefore, upwards of 100,000 men in the colonies from which the Naval Reserve may be recruited. The seafaring population of Canada have not yet been drawn upon for the Naval Reserve. In Newfoundland and the ports of the maritime provinces the enrolment of reserves will have a most beneficial effect in many ways. In the severe winter months the drills at shore batteries will afford, as in the Shetlands, employment for seafaring men which will be eagerly sought. The reports thus far received of the Naval Reserve men raised in Newfoundland are highly satisfactory.

It is no idle dream to believe that, with liberal terms of service and adequate facilities for drill, our Colonial reserve force may in the course of time be raised to an aggregate strength of 30,000. Colonial Naval Reserves would assist in manning ships on foreign stations in peace. In time of war they would undertake necessary defensive duties on the coast of their own colony and in colonial waters. They would help in manning the Fleet and fighting the enemy in any part of the world. Nor is the political consideration, on which Sir Edward Grey's Committee insist, to be regarded lightly. Colonial reserves would encourage a spirit of partnership in the Imperial Navy among all sections of the Empire. The Colonial Naval Reserve

is only "in the beginning." Under tactful administration on the part of the Admiralty, supported by a wise liberality on the part of the Treasury, the force is certain to grow. The statesmanlike plan of combined effort for Imperial defence must rest on the principle of co-operation.

Naval Volunteer Reserve. As one of those concerned in the enrolment of the Royal Naval Volunteer force, it is a source of the deepest satisfaction—shared by all the comrades of those earlier days—that the volunteer movement in connection with the Navy has been revived. The men formerly enrolled were full of loyalty and zeal. They were smart in gunnery. They could pull a strong oar. Their general intelligence was remarkable. They were ready to bear hardships, and to do the most irksome duties, when embarked in gunboats. This force was too hastily disbanded. The report of the Committee on Reserves indicates clearly that such was their view. "The experience of the Army had shown that large numbers of civilians take a pride in acquiring military knowledge and discipline. It seemed wasteful that all the amateur talent in this country should, for lack of opportunity, be obliged to turn to military to the exclusion of naval training. In view of the expansion of the Fleet that might be found necessary in a struggle for the supremacy of the British Empire at sea, the Committee were assured that a body of volunteers would prove a most valuable auxiliary branch to the *personnel* of the Navy in time of war. . . . With only a slight acquaintance with sea work, but with a good knowledge of the use of naval arms, a body of volunteers full of enthusiasm should be able upon occasion to render most useful service. It would be better that this body of men should at first be small in numbers and efficient, rather than a large, inefficient and unreliable force, which would be more costly and of less use to the Service."

The strength of the Naval Volunteer Reserve on December 1, 1904, was 3053. The numbers voted this year are 4700.

It is always easy to increase numbers. It is less easy to maintain a high standard of efficiency. On one point it is a duty especially to insist. Let there be no meanness or cheese-paring on the part of the Treasury. The cutting down of remuneration for instructors, the refusal to provide necessary drill sheds and means of instruction —that miserable policy of the War Office, depending, as it has been customary to do, on the subscription of officers for minor but necessary expenses, and giving the highest commissions, not to the most competent, but to those of the longest purse—should not be permitted in the dealings of the Admiralty with the Naval Volunteers.

The Committee on the Reserves made several recommendations, on which no action has yet been taken. They consider it desirable to establish Royal Marine Volunteers for service in the Fleet in war, under conditions similar to those authorised for the Royal Naval Volunteers. The Royal Marine Volunteers should be first enrolled in the immediate neighbourhood of the divisions of Royal Marines where training facilities already exist. As larger numbers are required, the movement would be extended.

Committee on Reserves. Royal Marine Volunteers.

The Reserves Committee called special attention to the Army as a reserve for the Fleet. Troops of the line were embarked in the Fleet under Lord Nelson and his illustrious companions in arms. In more than one battle they did valuable service. At St. Vincent, the boarders led by Lord Nelson were infantry soldiers. Some portions of the Army should be specially trained in peace time for the contingency of services on board ship. Certain regiments should be permanently in garrison at the naval ports—at Chatham, Portsmouth, Plymouth, Pembroke, Queenstown, Malta, and Gibraltar. In addition to their military instruction, they should be exercised in boats, and drilled with the Marines as naval gunners. For extra drills extra pay should be given.

The Army as a reserve for the Fleet.

The reserve of stokers is the branch for which it is most difficult to raise recruits. As it will have been seen from the figures given, a good beginning has been made. We have to consider the means for further increasing the reserve of stokers. Numerous recommendations are put forward in the Report of the Committee on Reserves. Many stokers, with previous experience afloat, are now employed in engineering and shipbuilding yards. The Royal Naval Reserve should be opened to men of this class, care being taken to test their qualifications for the sea service. The Reserve should also be opened to stokers from gas and electric works, three months' training in His Majesty's ships, and a test of efficiency being insisted upon. The Reserves Committee shared the favourable impression, formed by the Committee on the Manning of the Mercantile Marine, as to the efficiency of Lascars and Kroomen as stokers. They recommended that local arrangements should be made for the enrolment of a reserve of stokers at Hong Kong and Singapore. Should not Bombay and Calcutta be included? Malta can supply a strong reserve of stokers for the Mediterranean.

Stokers.

To one who was a sea-goer in years long past, it seems regrettable that all masted ships should have disappeared from the training service for boys. Stationary ships are now mastless; the brigs are paid off, as well as the masted cruisers lately employed for recruiting for the Navy at the outports. At our schools ashore health and

Training.

strength are developed by cricket and football. For the young seaman we had the masts and yards. They are gone, and the Navy will be the poorer. Physical drill in the gymnasium is not a satisfactory substitute for training aloft. To the layman, it is difficult to believe that necessary instruction in gunnery and small arms could not have been combined with a course of training which was very valuable, not only for physical development, but for professional instruction. The seaman, as we have known him, has been pre-eminently a "handy-man." Will he have his old characteristics as fully developed under the new as under the old system of training? The most progressive of naval Powers, the United States, is building two steel training-ships and a training-brig, which are to be propelled by sail-power only.

In conclusion, the Admiralty have a noble force at their disposal for the manning of the Fleet. We are reminded by the First Lord, that it was laid down by Sir Edward Grey's Committee that the total reserve force should be fifty per cent. of the numbers required to mobilise the Fleet for war. This standard has now been reached. It is satisfactory to know that no difficulty would be experienced in raising the numbers. We have the assurance of the First Lord that, "whether for the active service ratings of the Navy, boys, youths, and men for the Royal Marines or for the Royal Naval Reserves, nothing could be more satisfactory than the numbers and quality of those wishing to join His Majesty's force. Indeed, the number of eligible candidates is far in excess of the requirements."

It is not well to postpone the organisation of forces until the emergency has come. The march of events is rapid in these later days. Our Reserves can only be made valuable by careful training. Both as a preparation for defence, and as a means of economy in expenditure on permanent men in excessive numbers, it has seemed a duty once more to urge the suggestions contained in this paper.

II.—The Manning of the Mercantile Marine.

Having considered the manning of the Navy, we may turn to the Mercantile Marine. The growth of the British Mercantile Marine during the period 1860–1903 is shown in the following table extracted from the last Report of the Board of Trade on the progress of Merchant Shipping:—

Year.	United Kingdom only.			British Empire.		
	Steam.	Sail.	Total.	Steam.	Sail.	Total.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
1860	454,327	4,204,360	4,658,687	500,144	5,210,824	5,710,968
1870	1,112,934	3,851,045	5,690,789	1,202,134	5,947,000	7,149,134
1880	2,723,468	3,851,045	6,574,513	2,949,282	5,498,859	8,447,141
1890	5,042,517	2,936,021	7,978,538	5,413,706	4,274,382	9,688,088
1900	7,207,610	2,097,498	9,304,108	7,739,798	3,011,594	10,751,392
1903	8,399,668	1,868,936	10,268,604	9,029,386	2,802,053	11,831,439

The following statistics of the number of British and Foreign persons employed are taken from the same Report:—

	British Employed. *	Foreigners Employed.*	Proportion of Foreigners to every 100 British.*	Lascars.	Total.
	Exclusive	of Masters.			
1860	157,312	14,280	8·08		
1870	177,951	18,011	10·12	Cannot be	stated.
1880	169,692	23,280	13·72		
	Inclusive	of Masters.			
1890	186,147	27,227	14·63	22,734	236,108
1900	174,532	36,893	21·14	36,023	247,448
1903	176,520	40,396	22·88	41,021	257,937

* Excluding Lascars.

During the last forty-three years the proportion of foreigners to every one hundred British persons employed has risen from 9·08 to 22·88, and in 1903 the British Mercantile Marine was manned to the extent of 46·1 per cent. of foreigners and Lascars.

Coincident with the diminution in the number of British seamen and the increase in the foreign seamen employed, considerable increase is seen in the number of Lascars and other Asiatic seamen employed on British merchant vessels. Lascars and other Asiatics, though employed almost exclusively on steam vessels, now exceed the total number of foreign seamen in all classes of British ships. The increase of Asiatics during recent years has been more rapid than the decrease of British, or the increase of foreign seamen. Four-fifths of the tonnage of the United Kingdom consists of steamers. In northern waters and on the ocean routes British steamers are chiefly manned by British crews. Foreigners are employed in sailing-ships; Lascars in the steamships passing through the Suez Canal to the East.

The increasing employment of foreign seamen is not attributed by the Board of Trade Committee to differences in the scale of wages, Wages.

the rates at Home ports being usually the same for British and foreign seamen. Wages are lower at Hamburg and Antwerp than in British ports, and crews largely consisting of foreigners are shipped at those ports for the manning of British vessels.

Lower in sailing ships.

As regards the sailing-ships, wages are on a comparatively low scale, and hardships are more or less inevitable when making long voyages. The wages, as given in the latest return on the progress of merchant shipping, are for able seamen sixty shillings per month in sailing-ships, as against ninety shillings in steamships. Firemen's wages in the North American trade are a hundred shillings, in the Australian trade eighty shillings a month. In all cases food is provided in addition to wages. The inferior position of the seamen in sailing-ships, in the matter of wages, is conspicuous, and all the conditions are less attractive. They were described in the evidence given to the Board of Trade Committee by Mr. Basil Lubbock, author of that graphic story of the sea "Round the Horn before the Mast." "The class from which the foremost hands are drawn has become far more enlightened than it used to be, and is no longer willing to ship on deep water sailing-ships and to work for the smallest living which is given for skilled labour, besides having to endure a very rough life indeed, and also to live on the smallest quantity of food which it is possible for a man to live upon. It is not to be compared with the quality of food that a man gets on shore. The pick of British sailors —I will not say entirely, but the greater part of it—is taken up by mail boats and the better classes of steam tramps; of course the yachts have a great number. Any man who is a steady, hard-working man tries his best to get on a well found steamer." Mr. Basil Lubbock put in some graphic touches. "The Board of Trade scale—pork one day and beef the other—in the tropics, with a bad cook, produces an awful amount of boils."

As to sailing-ships, it is clear that the conclusions drawn by the Board of Trade Committee are fully supported by the evidence, where they say:—"We do not doubt that the main cause for the decrease of British seamen in the Mercantile Marine is the attractiveness of shore employment, with its greater comforts and superior facilities for the maintenance of a home." Wages cannot be raised by the method of legislation. Competition is intense, the most severe which the British shipowner has to encounter being that under his own flag. Economy under every charge is imperative, and if not sedulously practised, slender profits may soon turn to heavy losses. The law cannot compel the shipowner to pay more than the conditions of trade allow. Nor can we turn to protection.

Lascars.

As it has already been observed, Lascars are chiefly employed in

the trades within the tropics. They are more suitable than Europeans for service in the hottest climates of the world. The observations in Lord St. Helier's report—to give to Sir Francis Jeune the promotion which he has so well merited—may be quoted: "Lascars are in most cases hardy sailors, and have special qualifications for work as firemen in hot climates. They are temperate, and those who came before us made a most favourable impression. The evidence shows that they make most amenable and contented crews. In consequence their employment as firemen has grown almost universal in the tropics, and they are also largely employed in vessels trading between ports within the tropics and the United Kingdom."

Manning of Merchant Ships Committee.

There is no reason to doubt that the observations of the Manning of Merchant Ships Committee, of which Sir Edward Reed was the able chairman, still hold true. "The unrestricted admission of foreigners and Lascars, at low rates of pay, must result in diminishing, outside of the Royal Navy, the number of British seamen. The British sailor, having perhaps qualified himself for the rating of A.B. by four years' service before the mast, is shipped on no better terms than Scandinavians, Germans, French, Italians, Greeks, Turks and Negroes, some of whom may possess no proof of qualification and no adequate knowledge of the English language. Any deterioration of British seamen which may now exist is not owing to the decadence of our countrymen, nor to their dislike for the sea, but to the lack of sufficient attraction in the sea service as at present conducted to draw and hold the best class of British workmen." As remedial measures, the Committee recommended training-ships, tests of qualification for the rating of A.B., and a scale of manning.

The diminution of the number of British seamen in the British Mercantile Marine is not only due to the greater attractiveness of shore employment. In an article dealing with Naval Reserves in the *Naval Annual* for 1898, it was pointed out that it is difficult for a British boy to get to sea except as a fisherman. "British sailing-ships do not as a rule carry 'boys,' as distinguished from apprentices, for whom their parents pay a considerable premium, and the 'boys' carried in steamships certainly do not become 'seamen.' Of the truth of the first of these assertions I can give interesting evidence. During the autumn of 1897 two conferences were held at Government House, Melbourne, at which the masters of all the large sailing-ships then lying in the port were invited to be present, in order to discuss the manning of the Mercantile Marine. At the second of these conferences it was ascertained by direct inquiry that only seven boys were carried on the seventeen ships represented, and some of these were rated as 'ordinary seamen.' The truth of the

second assertion is self-evident.* In these days of acute competition shipowners cannot afford to train 'boys' for the seaman's profession, and they certainly cannot be expected to do so as long as there is an adequate supply of efficient seamen to man their ships. Leading shipowners have assured me that such a supply is forthcoming. Whether these seamen are Britishers, Scandinavians, or Dutchmen is of no concern to the shipowners as men of business, but it is of very vital interest to the nation."

Mr. Ritchie's scheme.

An attempt was made in 1898 to remedy the evil by an amendment introduced by Mr. Ritchie, then President of the Board of Trade, in the Merchant Shipping Act:—

"On proof to the satisfaction of the Board of Trade that a British ship has during any financial year carried, in accordance with the scale and regulations to be made by the Board of Trade with the concurrence of the Treasury, boys between the ages of 15 and 19, there shall be paid to the owner of the ship, out of moneys provided by Parliament, an allowance not exceeding one-fifth of the light dues paid during that year in respect of that ship. Provided that no such payment shall be made in respect of any boy unless he has enrolled himself in the Royal Naval Reserve, and entered into an obligation to present himself for service when called upon, in accordance with rules to be issued by the Admiralty. The scale and regulations aforesaid may be modified from time to time by the Board of Trade with the concurrence of the Treasury. This section shall continue in force until the 31st day of March, 1905, and no longer, unless Parliament otherwise enact."

Objections to it.

Mr. Ritchie's scheme was from the first unpopular with the shipowners on account of its connection with the light dues, and the extreme inequality of its operation. A short voyage steamer has been paid at the rate of £30 for each boy carried, whereas a long voyage sailing-ship, admittedly the best school for boy sailors, can only earn £1.

Training home of Navy League.

The Manning Committee of the Navy League have also been endeavouring to find a solution for the deficiency in the supply of British seamen. The Liverpool Branch of the League has a training-school already in operation. The sum of £13,000 having been raised, seven acres of land at Liscard, on the banks of the Mersey, were purchased, and suitable buildings were erected. The school was opened in October, 1902. Success was immediate. There are now more than 100 boys in the school; some boys have been already drafted into the Royal Navy, others have gone to the Mercan-

* Boys carried in steamships are employed in cleaning work, etc., and in many cases are not even taught to steer.

tile Marine, to become, as it is hoped, when fully qualified, seamen of the Royal Naval Reserve. The school at Liscard has been imitated by the Surrey Education Committee, with results so satisfactory that it has been resolved to offer scholarships tenable at the Liverpool School.

The Liverpool School has been inspected on behalf of the Secretary of State for Scotland. It is contemplated to send to the school annually 200 boys from the Highlands. The Liverpool School has undergone a still more searching examination by an inspecting officer from the Admiralty. It is cheering to read in Captain Fleet's report that the boys are happy and contented, well turned out, in good physical condition, and fairly proficient in drill. As it has already been said, training-ships must undoubtedly do good in improving the physical condition of the boys, and there is also the moral good in the case of boys drawn from miserable homes. It would be a public advantage if more training-schools, such as that near Liverpool, could be established at suitable localities throughout the United Kingdom. Boys could be drafted from these schools as "probationers" of the Royal Naval Reserve, to serve their indentures on ships of the Mercantile Marine, and having had some training in the rudiments of their profession, would be of some value to the shipowner from the start. Such schools, worked in conjunction with the scheme described below, would afford some solution of the important national question: the dearth of British seamen in the Mercantile Marine.

New scheme of Board of Trade.

We have now to refer to the latest incidents in connection with our subject. At a meeting of the Council of the Chamber of Shipping of the United Kingdom, held in July, 1904, the subject of boy sailors was specially considered. The results were submitted in a letter addressed to the Board of Trade. The Council were of opinion that the scheme prepared by Mr. Ritchie for the encouragement of the training of boy sailors, dependent as it was upon an abatement of light dues to shipowners, was a failure. The principle that the cost of lighting the coasts of the United Kingdom should be borne by the nation having been for the first time affirmed by a recent vote of the House of Commons, it had become necessary to reconsider the subject. The Council submitted that a new plan should be proposed under which an annual grant should be made by the Government to shipowners for boys carried in their vessels, who were willing to enter as probationers in the Royal Naval Reserve.

In reply to the letter addressed by the Chamber of Shipping to the Board of Trade, a communication was received in November, 1904, giving in outline an alternative scheme, prepared after consul-

tation with the Admiralty. Recognising that owners would be unwilling to carry boy sailors, unless indemnified against pecuniary loss, it was proposed to make payments from moneys taken under the Royal Naval Reserve Vote. The chief features of the scheme are as follows:—

1. Grant of £10 to shipowner, in respect of first year of training of a deck hand. Further grant of £5, in respect of second year of training.
2. Each boy sailor to be indentured, and to be enrolled in a special class of the Naval Reserves, to be called the Probationer Class, and to undertake to join the Seaman Class Reserve, on the completion of his indentures.
3. Boys enrolled in the Probationer Class not to be liable to be "called out" at time of mobilisation, nor to attend drill until passed into the Seaman Class Reserve.

   To be paid retainers in quarterly instalments:—
   - £1 for the first year of enrolment.
   - £1 10s. " second "
   - £3 " third "

   Suit of uniform clothing to be provided.
4. Apprenticeship—
   (1) Term of three years, subject to a probationary period of six months.
   (2) Pay, first year, £8; second, £12; third, £15.
   (4) Accommodation apart from the crew.

The cost to the Crown for every 500 boys enrolled is worked out in the table below:—

First year.	Grant of £10 for each of 500 boys enrolled	£5,000
	Retainer, £1	500
	Uniform	625
Second year.	Grant of £5 for 440 boys, allowing wastage of 12 per cent.	2,200
	Retainer, 30 per cent. each boy	660
Third year.	Retainer, £2 for each of 420 boys, taking waste at 5 per cent.	840
	Bonus of 30 per cent.	600
	Total 3 years expenditure	£10,425

Under the scheme, 400 boys would enter every third year the Seaman Class R.N.R., at an annual cost of £3,475. To keep up an annual entry of 400 boys would cost £10,425 per annum, or at the rate of £26 a boy.

The new scheme, it was held, would be more advantageous to the Crown than that initiated in 1898. The cost would, as it has been said, be £26 per boy, as against £30 to £40 for each third-class boy promoted under the old scheme to the second class. The training would be better. The scheme provided adequately for the indemnification of shipowners, who would lose in the first year of service, but would gain later. Well-trained boys are worth their salt after a year at sea.

It is easier to formulate schemes on paper than to carry them through. The initiative is not likely to come either from the shipowners or the Admiralty. It will be best supplied from the efforts of those who look to the growing proportion of foreigners in the Merchant Service as a national misfortune. It will be the duty of the Manning Committee of the Navy League to press for early action and effective remedial measures.

BRASSEY.

CHAPTER IX.

The Imperial German Navy.

I.—Administration and History.

By virtue of the constitution of the German Empire the Kaiser is the Bundesfeldherr, or Federal Commander-in-Chief of the whole German Army, and in time of war holds supreme command, whilst in time of peace the Kings of Bavaria, Württemberg, and Saxony retain their sovereign rights as heads of their respective armies; but the German Navy is Imperial (Kaiserlich), and the German Emperor (Deutscher Kaiser) is, as such, the supreme Admiral in command of the Imperial German Navy in peace as well as war. **Administration.**

After the Austro-German War of 1866, the Prussian Fleet became the fleet of the North German Bund—the other states contributing to its support. At the conclusion of the Franco-German War the fleet of the North German Bund became the Imperial German Navy (Kaiserliche Deutsche Marine), and on December 31st, 1871, the "Imperial Admiralty" was brought into existence. On March 30th, 1889, Kaiser Wilhelm II. abolished the "Admiralty" and replaced it by two separate organs of authority, viz.: (*a*) the "Ober-Kommando der Marine," or office of Admiral-in-command of the Navy; and (*b*) the Reichs-Marine-Amt (Imperial Navy Office), or Administrative Department. The former was placed under an Admiral-in-command who was to be in immediate subordination to the Kaiser, just as are the Generals in command of the various Army Corps of the Army; and the Reichs-Marine-Amt was to fulfil the same functions as regards administration and the direction of the development of the Navy as the War Ministry in Prussia does for the Army, and was to be placed under a Secretary of State like all the other Imperial Departments.

The Imperial Navy is under the supreme command of the Kaiser, whose Naval Cabinet performs the functions of his private bureau in naval matters. The Naval Cabinet deals with matters connected with the Navy similar to those which in the case of the Army are laid before the Military Cabinet—that is to say, with matters concerning

the personal relations of the officers of the service, *e.g.*, appointments, promotions, transfers, leave, etc.

Present organisation.

In 1899 the "Ober-Kommando der Marine" was abolished, and the subjoined organisation for the Imperial Navy was substituted:—

1. The Reichs-Marine-Amt (the Imperial Navy Office), which corresponds to the British Admiralty at Whitehall. It is the head department of the administration of the Navy, and its chief fills the office of Secretary of State for the Imperial Navy. The functions of the Imperial Navy Office are to see to the organisation, the maintenance, and the development of the Navy, and the department is divided into numerous sections. The Secretary of State for the Imperial Navy represents the Navy in the Reichstag and in the Federal Council (Bundesrath). The present Secretary of State, having been created a Minister of State by Kaiser Wilhelm II., has as such a seat and a vote in the Federal Council.

2. The Admiral of the Active Battle Fleet.

3. The Admiralty Staff, which is the Intelligence Department for naval matters, and corresponds with the British Naval Intelligence Department.

4. Two Chiefs of Naval Stations—the Baltic and the North Sea.

5. The Inspector of Naval Instruction.

6. The Chief of the Cruiser Squadron (*i.e.*, the squadron which is now stationed in the Far East).

Historical summary.

The Germans look back upon the Brandenburg Navy of the Great Elector, Friedrich Wilhelm, as the commencement of their naval history. The Elector (1640–1688) had learnt something about sea matters in Holland as a young man, but his Navy, which he got together in 1675, came to an inglorious end, most of the ships being mortgaged by 1717 or having fallen into other hands. In his days Pillau was the naval station. After the death of the Great Elector, Germany was not represented on the seas at all by a navy for about a century and a half.

Foundation of German Imperial Navy.

The next period was that of the German Imperial Navy (die Deutsche Reichs-Marine) of 1848, which was founded against the attacks of the Danes who blockaded the Elbe and the Baltic. This navy was dissolved in 1852, as peace having been concluded two years before, all interest in naval matters had died away in Imperial Germany. More serious than the difficulty of securing ships at this time was the difficulty of obtaining German officers and German seamen. Seamen were mainly obtained from America and Belgium, and more French and English than German was spoken on ships of the German Navy. When the Fleet was dissolved in 1852, some

of the ships were purchased by an English steamship company, and the rest were sold by auction in March, 1853.

Prussia, however, had determined to build a navy for herself in 1848, in order to defend her Baltic coasts against the interference of the Danes. Prince Adalbert of Prussia took a leading part in creating this navy. He was assisted by a Dutch naval officer who was an exceedingly good organiser. Prussia then saw that it would fall to her lot to defend German interests on the sea. In 1848 the country was quite unaccustomed to anything affecting the sea. Shipping yards had to be enlarged so that warships could be built, and money had to be forthcoming for covering necessary expenses. In consequence of the first of these conditions the *personnel* had to be created, trained, and educated. It was desired to have exclusively Prussian subjects in the Prussian Navy; but as regards officers, this was at first impossible, seeing that there were not sufficient who understood their work. Consequently foreigners were taken, and a commencement was made with the training of cadets.

The Prussian Navy, 1848.

Up to 1853 the Prussian Navy was administered by the Ministry of War, where there was a special naval department under the command of a major of the Army. In November, 1853, the King founded the "Admiralty," which was to be the chief department for the Navy, and Prince Adalbert was appointed Admiral and Commander-in-Chief. The chief naval stations then selected were Stettin and Dantzig; but the Grand Duke of Oldenburg ceded to Prussia a certain tract of land on the Jade, where Wilhelmshaven now stands, in return for the promise to protect the oceanic trade of the Grand Duchy of Oldenburg.

During the 'fifties of the nineteenth century the Prussian warships behaved creditably wherever they were sent. In 1859 Prince Adalbert was appointed Inspector-General of the Navy, and the "Admiralty," with the Prussian President of the Ministry at its head, was abolished in 1861. A Ministry of Marine was created in its place, united with the Ministry of War under General von Roon. The naval programme drawn up in 1863 under this new organisation claimed "to give Prussia a respectable place amongst the second-rate naval Powers of Europe." In 1864 and 1866 the Prussian Navy was not in a position to undertake any action worth speaking of; but in small engagements the *personnel* behaved themselves very creditably.

After the war of 1866, the Prussian Navy became the navy of the North German Bund, under the command and at the disposal of the King of Prussia. A new naval programme was accordingly drawn up in 1867; but, as the Prussian shipping yards were at that time totally inadequate for building armoured vessels, it was impossible to

The Navy of the North German Bund.

procure any suitable warships by 1870. Furthermore, there was always a scarcity of funds, so that the programme that had been laid before the Diet of the Bund had not become law, having been postponed from year to year. Still something was done between 1867–1870 to make a historic commencement. Kiel and Wilhelmshafen were declared to be the naval ports of the Bund; the royal shipping yards were enlarged; the coast defences were improved; and arrangements were made, both at Kiel and Wilhelmshaven, to do something for the training of seamen. When, however, war broke out with France, the Navy of the North German Bund was wholly unprepared. With the exception of a couple of plucky incidents, there is nothing of importance to record of its activity.

Imperial German Navy.

After the Franco-German war, the fleet of the North German Bund became the Imperial German Navy, which is the German Navy of to-day. Prince Adalbert of Prussia died in June 1873, and shortly after his death Lieut.-General von Stosch was appointed chief of the Admiralty. At that time no officer of the Navy was sufficiently qualified to fill the post. General von Stosch possessed a great talent for organisation. He immediately introduced a plan for founding a fleet which was to be one of second-class rank, capable of taking the offensive in the North Sea and the Baltic. He took steps which enabled the shipbuilding industry in Germany to start on a firm footing, organised the *personnel* of the Navy, both officers and men, and laid the basis for its present organisation. His successor, General von Caprivi, encouraged the development of torpedo-boats, and paved the way for future developments under Kaiser Wilhelm II. who has always devoted his personal attention to the Navy, which he early determined to reorganise as thoroughly as his grandfather Kaiser Wilhelm I. had reorganised the Army.

In 1897 Admiral von Tirpitz (then Rear-Admiral Tirpitz) was appointed Secretary of State for the Imperial Navy Office. Meanwhile the Service had become extremely popular and had found warm supporters in the Reichstag and throughout the Empire.

The Navy Act of 1898.

The Navy Act of April, 1898, was the first Act passed by the legislature affecting the strength of the modern Imperial German Navy. It prescribed that the Navy should be enlarged in such a way that by 1903 it should consist of 19 battleships, 8 coast defence vessels, 12 large (armoured) cruisers, 30 small (third-class) cruisers, and further provided that battleships and coast defence vessels should be discarded after 25 years; large or armoured cruisers after 20 years; and third-class cruisers after 15 years; and that the discarded vessels should respectively be replaced by new ones.



GERMAN BATTLESHIP "BRAUNSCHWEIG."

The political events of the next two years induced the German Government to introduce a new programme on June 14, 1900. According to this programme the German Fleet is to consist by 1920 of:— The Navy Act of 1900.

	Battleships.	Armoured Cruisers.	Third-class Cruisers as Scouts.	Destroyers.
Two double squadrons consisting together of	34	8	24	80
For foreign service	—	3	10	—
In reserve	4	3	—	16
Total	38	14	34	96

In other words of:—

a. Two double squadrons of 17 ships each, *i.e.*, 34 ships all told, all under 25 years old 8 armoured (large) cruisers (4 for each squadron) 24 third-class class cruisers, as scouts (12 for each squadron) 80 destroyers (40 for each double squadron)	For the Home fleet, *i.e.*, concentrated in Home waters.
b. 3 armoured cruisers 10 third-class cruisers	For foreign service.
c. 4 battleships 3 armoured (large) cruisers 16 destroyers	In reserve.

N.B.—The limit of age of battleships will be 25 years, that of cruisers 20 years.

In 1900 six additional armoured (large) cruisers and seven additional third-class cruisers—13 ships intended for foreign service—were refused by the Reichstag. It was generally accepted that the German Admiralty would utilize the first opportunity for completing the original programme. All doubts on this point have now been removed by the statements made by Admiral von Tirpitz in February before the Committee of Supply in the Reichstag. Admiral von Tirpitz stated that he contemplated presenting to the Reichstag next autumn a Navy Act Amendment Bill, in which he would probably ask for the restoration of the six large (armoured cruisers) which were struck out of the 1900 Bill, and for seven destroyer divisions, (*i.e.*, 42 destroyers), in place of the seven small (third-class) cruisers also then struck out. This Bill, after having been laid before the Federal Council and approved, will come up for discussion in the Reichstag early next year (1906). The doubts as to whether battleships would be asked for in the autumn are now dispelled. The German Admiralty does not for the present intend to ask for new

battleships. It is proposed to arrange as follows for the building of the cruisers and destroyers. The six large cruisers will fill up the four years' gap, 1906–9; and the building of the destroyer divisions will be arranged so that a new division will be laid down annually for seven consecutive years, beginning with 1906, in addition to the annual substitute divisions already granted. There is to be no acceleration in shipbuilding.

Present strength of Navy.

The German Imperial Navy consisted on January 1, 1905, of 27 battleships, 8 coast defence ships (a total of 35—viz., first, second and third-class battleships according to British classification); 7 armoured cruisers; 6 protected cruisers; 35 third class (small) cruisers (viz., 24 protected, 11 unprotected); 10 gunboats; 53 destroyers (mostly equal in size but not in armament to British destroyers); 79 small torpedo boats of various sizes, many of them only useful for training purposes, and a number of special ships and gunboats of no great fighting value on the high seas.

Subjoined is a list of the effective ships of the Navy above summarised, with their tonnage and the date when they were laid down, from which will be seen the date when the limit of age will be reached:—

BATTLESHIPS (35).

	Displacement.	When laid down.		Displacement.	When laid down.
1st *Class* (22).			2nd *Class* (5).		
"P"	12,992	1904	Oldenburg	5140	1883
"O"	,,	,,	Baden	7252	1876
Deutschland	,,	1903	Württemberg	,,	,,
Lothringen	,,	1902	Sachsen	,,	1875
Preussen	,,	,,	Bayern	,,	1874
Hessen	,,	,,			
Elsass	,,	1901			
Braunschweig	,,	,,			
Mecklenburg	11,613	1900			
Schwaben	,,	,,			
Zähringen	,,	1899			
Wettin	,,	,,	3rd *Class* (8).		
Wittelsbach	,,	,,	Coast-defence ships.		
Kaiser Barbarossa . . .	10,976	1898			
,, Karl der Grosse .	,,	,,	Hagen	4049	1894
,, Wilhelm der Grosse	,,	,,	Heimdal	,,	,,
,, Wilhelm II. . .	,,	1896	Odin	4084	1893
,, Friedrich III. . .	,,	1894	Hildebrand	4049	1893
Wörth	9,874	1890	Ægir	4084	1892
Brandenburg	,,	,,	Frithjof	4049	,,
Kurfürst Friedrich Wilhelm	,,	,,	Beowulf	,,	,,
Weissenburg	,,	,,	Siegfried	,,	1890

Armoured Cruisers (7). Protected Cruisers (6).

	Displacement.	When laid down.		Displacement.	When laid down.
"C"	11,319	1904	Hansa	5791	1896
Yorck	9350	1903	Vineta	,,	,,
Roon	,,	1902	Freya	5569	1895
Friedrich Carl	8858	1901	Hertha	,,	,,
Prinz Adalbert	,,	1900	Victoria Luise . . .	,,	,,
Prinz Heinrich. . . .	8759	1898	Kaiserin Augusta . .	5960	1890
Fürst Bismarck . . .	10,570	1896			

Third-Class (Small) Cruisers (35).

Protected (24).

	Displacement.	When laid down.		Displacement.	When laid down.
Leipzig (ex. "N"). . .	3200	1904	Amazone	2618	1899
Substitute Alexandrine .	,,	,,	Ariadne	,,	,,
Substitute Meteor . . .	,,	,,	Thetis	,,	,,
München	,,	1903	Nymphe	,,	1898
Lübeck	,,	,,	Niobe	2603	,,
Berlin	,,	1902	Gazelle	,,	1897
Hamburg	,,	,,	Hela	2004	1893
Bremen	,,	,,	Gefion	3705	1892
Undine	2657	1901	Comet	971	1891
Arcona	,,	1900	Prinzess Wilhelm . .	4224	1886
Frauenlob	,,	,,	Irene	,,	,,
Medusa	2618	,,	Jagd	1230	1887

Submarines.

There were on January 1, 1905, no Submarines in the German Navy. Some private experiments have been made during the last few years, and the subject has been closely followed by the German Admiralty. At the Howaldt Yards some experiments were made four years ago; but the boat with which the experiments were made no longer exists. The Germania Yard also made experiments last year with a Submarine built in their yards at Kiel. The chief naval officials at Kiel Harbour, including Admiral Prince Henry of Prussia, thoroughly inspected her, and some of them went down in her; but it was found that the boat did not satisfy the demands likely to be made by the Admiralty. The trials were of a private nature. The Germania Yard began to build another Submarine last autumn, which is now finished, and is said to have removed all the defects of the first one and to be likely to meet with approval. Up to this year Submarines have not figured in the German Estimates; but, as will be seen lower down in the section devoted to the Estimates for 1905–6, 1½ millions of marks (£73,421) have been set down for

experiments connected with Submarines, with a view of building at least one boat of this type.

The subjoined table will show at a glance the development of the German Navy from 1900–1917, and, read with tables given above, will furnish an exact notion of the numerical strength of the Navy for any given year within that period in battleships, armoured (large) cruisers, 3rd class (small) cruisers, and destroyers (torpedo-boats):—

	Battleships.	Armoured (large) Cruisers.	3rd Class (small) Cruisers.	Destroyers (Torpedo boats).
1901	2 additional ships	1 substitute ship	3 additional ships	6 substitutes
1902	2 ,, ,,	1 ,, ,,	2 ,, ,, 1 substitute ship	6 additional boats
1903	2 ,, ,,	1 ,, ,,	1 additional ship 1 substitute ship	6 ,, ,,
1904	2 ,, ,,	1 additional ship	1 additional ship 2 substitute ships	6 ,, ,,
1905	2 ,, ,,	1 ,, ,,	1 additional ship 2 substitute ships	6 ,, ,,
1906	2 substitute ships	—	1 additional ship 2 substitute ships	6 substitutes
1907	2 ,, ,,	—	2 ,, ,,	6 ,,
1908	2 ,, ,,	—	2 ,, ,,	6 ,,
1909	2 ,, ,,	—	2 ,, ,,	6 ,,
1910	1 ,, ,,	1 substitute ship	2 ,, ,,	6 ,,
1911	1 ,, ,,	1 ,, ,,	2 ,, ,,	6 ,,
1912	1 ,, ,,	1 ,, ,,	2 ,, ,,	6 ,,
1913	1 additional ship	1 ,, ,,	2 ,, ,,	6 ,,
,,	1 substitute ship	—	—	—
1914	1 ,, ,,	1 ,, ,,	2 ,, ,,	6 ,,
1915	1 ,, ,,	1 ,, ,,	2 ,, ,,	6 ,,
1916	1 ,, ,,	1 ,, ,,	2 ,, ,,	6 ,,
1917	2 ,, ,,	—	1 ,, ,,	—
Total	11 additional ships 17 substitute ships	2 additional ships 10 substitute ships	9 additional ships 29 substitute ships	24 additional destroyers. 72 substitutes.

II.—*Personnel.*

Officers.

There are 1409 officers in the German Navy—an increase of 100 as compared with 1904. In 1897 there were only 713 officers: hence there has been an increase since then of 696.

The officers consist of:—

Admiral of the Fleet (Gross-Admiral), viz., the Kaiser.

a. 27 Flag Officers—5 Admirals (Admiral), 6 Vice-Admirals (Vize-Admiral), 16 Rear-Admirals (Kontre-Admiral), four of these have only titular rank.

b. 514 Staff Officers—67 Captains (Kapitän zur See), 447 Commanders and Lieut.-Commanders (Fregatten-Kapitän, Korvetten-Kapitän).

c. 833 Senior Lieutenants, Lieutenants, and Sub-Lieutenants (Kapitän-Leutnant, over 8 years' service; Ober-Leutnant zur See, less than 8 years' service; Leutnant zur See); 39 pensioned officers.

Midshipmen (Fähnrich zur See) hold rank between that of Warrant Officers and Petty Officers, and are entered on the subjoined list as Petty Officers; and Naval Cadets (See Kadett) rank as seamen. The number of midshipmen entered in the Estimates for 1905–6 is 378; that of naval cadets, 150.

The subjoined table gives the *personnel* of the German Navy for 1905-6:—

	Officers.	Navy Doctors.	The Men. Non-Commissioned Officers and Seamen.				Total.	Increase compared with 1904.
			Warrant Officers.	Petty Officers.	Seamen.	Ships' Boys.		
Naval Officers. . . . Pensioned Officers, 39 .	1409	—	—	—	—	—	1409	100
Junior Executives . .	—	—	—	378	150	—	528	—
Engineer Officers . .	243	—	—	—	—	—	243	20
Sailors, Boys, Dockyards, Torpedo Division . .	—	—	1411	7048	23,279	1110	32,838	2108
Seamen Artillery . .	—	—	34	319	2431	—	2784	397
Marine Infantry . . .	50	—	—	191	1038	—	1279	2
Personnel of the Clothing Office.	—	—	—	24	200	—	224	—
Medical *Personnel* . .	—	208	—	169	171	—	548	41
Artillery Administration	69	—	92	52	—	—	213	9
Torpedo *Personnel* (technical and administrative)	43	—	99	46	—	—	188	10
Mining *Personnel* (technical and administrative)	18	—	27	40	—	—	85	3
Accountant Department	—	—	71	194	40	—	305	25
Surveying Department .	—	—	28	—	—	—	28	—
	1832	208	1762	8461	27,302	1109	40,672	2715
	2040		38,632					

To these must be added 271 Paymasters from the Accountant Department who rank as Officers: they are entered under the head "Werft Divisionen" in the Estimates, as belonging to the Administrative and not the Naval *Personnel*.

Entry and training of officers.

The German Navy being Imperial (Kaiserlich), all the officers take the oath of allegiance to the Kaiser, who, as such, is the supreme Admiral-in-command in time of peace as well as of war.

Qualifications for candidates.

The corps of officers in the Navy is recruited from youths whose origin is approved of and who have qualified as naval cadets. Naval cadets are selected once a year—in April. The day of selection is fixed by the Inspector of Naval Instruction. Names must be sent in

for approval, together with the required certificates, to the Inspector of Naval Instruction at Kiel between August 1 and the 1st of the following February. The following are the qualifications required :—

a. Candidates must pass an entrance examination if they only possess a certificate showing that they are fit to be in the first class (6th Form) of a German *Gymnasium*, a German *Real-gymnasium*, or a *Reform-real-gymnasium*, or a Prussian *Ober-real-schule*, or a school of equal rank.

b. Candidates who have received a "leaving" certificate from one of the above-named schools are accepted without entrance examination.

c. Candidates from a military cadet corps school, on presenting a certificate showing they have passed the Army Ensign Examination, are also accepted without an entrance examination.

All candidates from *Gymnasiums* or *Real-gymnasiums* must have received the predicate "good" for English. Candidates from *Ober-real-schulen* must have obtained a certificate implying that they have a "good" knowledge of English and French to compensate for their deficiency of knowledge of Latin. Equivalent tests are required from candidates from schools in Bavaria, Württemberg, Baden and Elsass-Lothringen.

Training of cadets.

The age limit for those not presenting "leaving" certificates from school is 17; for those presenting "leaving" certificates, 19. The average age for the latter is between 17–19. A candidate can also submit himself at 16 years of age if he has already obtained his "prima" certificate, *i.e.*, his certificate showing that he is fit to be in the first class at school.

The names of candidates are submitted for approval to a commission of three or more naval officers appointed by the Inspector of Naval Instruction. Candidates who fail in the first examination can present themselves again if the commission recommend it. All candidates are subjected to a medical test before going up for examination. Those accepted as cadets are divided into two sections, namely, those who present a leaving certificate and those who present a certificate of another kind. Cadets on being accepted are subject to a military jurisdiction and rank as seamen, receiving pay as such. They are first trained for four weeks on land, receiving instruction of a general kind as to their duties as seamen and as to the use of the rifle. They are then sworn in, and are told off to the naval cadet training-ships, where they receive their first training in naval matters as well as in the ordinary subjects required of naval officers. The

number of cadets accepted varies every year, according to the requirements of the Service. The highest number taken was in 1894; but in general about 150 candidates are accepted. The training-ships cruise, as a rule, for some weeks in the Baltic before proceeding to foreign waters, and return to home waters in the following spring.

Midshipmen.

Those cadets who receive a certificate at the end of this cruise present themselves for the Fähnrich zur See (midshipman) examination. The names of the successful candidates are sent in and proposed as midshipmen. Those cadets who, during their first cruise, are considered unsuitable for the service of the Navy are reported to the Inspector of Naval Instruction, who decides whether or not they shall be dismissed. The captain of the training-ship takes the opinion of all the officers of the ship before sending in his report. Those who during their first cruise have not acquired sufficient practical knowledge to become midshipmen may, with the permission of the Inspector of Naval Instruction, take part in a second cruise on a training-ship, and at the end of the same may again present themselves for the midshipman's examination.

Successful candidates are then sent to the naval school (*Marineschule*) at Kiel for one year. The object of the course at this school is to give the midshipmen more scientific knowledge on shore. At the end of the course the midshipmen are required to pass the examination which qualifies them to become officers in the Imperial Navy. The Inspector of Naval Instruction determines whether unsuccessful candidates may be allowed to attend the course at the naval school for another year, or whether they are to be forthwith dismissed. After passing this examination the successful midshipmen are sent for six months to gunnery and torpedo training-ships, and to the marines—each course lasting about eight weeks—in order to receive special instruction for these three branches of the Service. At the end of each course they are required to pass an examination. After passing all three examinations the midshipman is considered to have completed his scientific training. He may then receive the permission of the Inspector of Naval Instruction to wear an officer's sword.

After the conclusion of these special courses the midshipmen go to sea for one or two years, according to the progress they make, at the end of which time they receive a certificate and their names are sent in for election as officers of the Imperial Navy. The midshipman's training thus lasts three and a half years, at the end of which time he becomes a sub-lieutenant. Cadets and midshipmen are subordinate to the Inspector of Naval Instruction.

The question whether a cadet should quit school before passing

his "leaving" examination has been much discussed. In naval circles it is generally held that he should leave after qualifying for "prima," that is for the highest class. By so doing a cadet would commence his professional training two years earlier, and the average age of officers of higher rank would thereby be lowered, as there is no promotion by selection in the German Navy. In consequence, however, of German conditions of life, parents must calculate on the possibility of their sons' failure to pass into the Navy; as in this case it is no longer possible for them, without having passed the school "leaving" examination, to enter one of the higher careers. Parents in general consider it advisable for a boy to secure this certificate. As, from a naval point of view, it is desirable that officers should be as young as possible, this certificate is obtained at the expense of the interests of the Service.

Entry and training of seamen. Ships' boys.

The object of the Ships' Boys Division is to train boys to become seamen, petty officers (*Unteroffiziere*), and warrant officers (*Deckoffiziere*). About six hundred of these boys are taken in April of every year at Friedrichsort, near Kiel. The age of entry for boys to this institution is from 14½ to 18. As a rule, they are at least 15½ years old.

Qualification for entry.

Boys desirous of joining the Ships' Boys Division must report themselves in person between May 1 and February 1, previously to their entrance, to the commander of the Landwehr District of their domicile, or personally to the division at Friedrichsort, taking with them their birth certificate, a written certificate from father or guardian containing permission to enter as ship's boy, certified by the officer of police of their domicile. They are then medically examined, and must be able to read, write, and do the first four rules of arithmetic. If accepted, their names are sent in to the Ships' Boys Division at Friedrichsort and are inserted in the list. The selection takes place not later than the middle of February.

The candidates must be physically strong and have no disposition to chronic diseases of any kind; their eyesight must be perfect at least in one eye, and they must be capable of distinguishing colours, have good hearing in both ears, and must not stammer. They must be at least 4·8 ft. high and have a chest measure of 28·7 in. Boys under 15 must be of exceptional physical development for their age. Those boys who, after a two years' course, have not attained the requisite standard are dismissed; those who have good capacities, but have not attained the required age of 17, or are not sufficiently developed physically, are retained for another year at Friedrichsort with a superior rank to that of their comrades.

The training in general lasts one year and a half, during which time the boys are not under military jurisdiction, but are classed as pupils. At first they remain about six months on shore, and are medically examined, clothed, and instructed in the elementary principles of seamanship. Then they are placed on board one of the boys' training-ships. After a cruise for a few weeks in the Baltic, they start for a cruise abroad, returning about the end of March in the following year. On their return they are sent home for a month's leave. During the next six months they receive instruction ashore as foot soldiers as well as instruction in naval matters. Having thus acquired sufficient knowledge to enable them to fulfil the duties of seamen, and having attained the age of 17, they can become ordinary seamen (*Leichtmatrosen*), and are drafted as such into the Imperial Navy and take the oath to the Kaiser. Their advance to the rank of able-bodied seamen, petty officer, and warrant officer depends upon their conduct and capacity. Training.

In consideration of the training received a ship's boy is required to serve for nine years—*i.e.*, training one and a half years, the ordinary period of three years' compulsory service, and a further four and a half years for the training received.

The cost of maintenance for a ship's boy is reckoned at 540 marks (*i.e.*, about £26 10*s.*) per annum. If a boy is desirous of leaving the division before completing his training, he can do so with the permission of his father or guardian, on the payment by the latter of the above amount for each year he has enjoyed the training. The number of ships' boys is now 1100.

Subjoined are the provisions for the training in gunnery for the captains of turrets (*Stückmeister*) and their subordinates. They are selected from men of the rank of petty officers (*Bootsmannmaate* and *Ober-bootsmannmaate*), who— Gunnery.

(*a*) After their gunnery training on board one of the artillery training-ships have obtained a certificate of proficiency in gunnery;

(*b*) have done good artillery practice with guns of any calibre, and have shown sufficient proficiency to entitle them to be entrusted with any responsible post at the guns.

The right of accepting any candidate rests with the captain of any ship in which the petty officer in question has gone through a complete period of gunnery training as captain of gun (No. 1)—*Geschützführer*—with 3·45-in. (8·8 cm.) or 5·9-in. (15 cm.) guns, *i.e.*, secondary armament.

Candidates who have only been trained in the use of secondary armament guns or quick-firing guns must be sent to a gunnery

training-ship to go through a course of training to obtain proficiency as captain of gun (No. 1). Candidates for captain of turret who have gone through a course of training as captain of gun are to be taken by preference as captains of heavy guns and of the more important guns of the secondary artillery on board battleships, coast defence ships, armoured (large) cruisers, and the artillery training-ships. They serve for three years on board a ship of the above-named classes. The conditions for promotion to the rank of captain of turret are:—

(*a*) Thirty months' training as captain of gun on board a battleship, a coast defence ship, or an armoured (large) cruiser;

(*b*) The obtaining of a certificate from the commanding officer of one of these ships, showing that the candidate, besides having ordinary gunnery qualifications, can act independently with specially important guns, and has a thorough knowledge of the guns belonging to the ship in question. The certificate must not be more than a month old.

The condition for promotion to the rank of captain of turret with chief warrant rank (*Ober-stückmeister*) is that the candidate shall have made a ten months' cruise, and shall have shown proficiency on board as captain of turret.

Recruiting. The whole able-bodied male population of the German Empire is under an obligation to perform military service (*Militärpflicht*) either in the Army or in the Navy:—"Every German is in duty bound to defend his country, and he cannot discharge this duty through a substitute" (*cf.* The National Code of the German Empire, April 16th, 1871). Every German may be called upon by law to serve either in the Army or the Navy from the completion of his seventeenth to the completion of his forty-fifth year. This obligation to serve the country is called the *Wehrpflicht*; it is subdivided into the *Dienstpflicht* (the actual time of service) and the *Landsturm*. In general, a conscript begins to serve on attaining the age of twenty.

Of the naval conscripts that enter the Navy every year as seamen, one-third belong to the seafaring or semi-seafaring population of the Empire, and two-thirds are landsmen.

For the Navy the service is divided as follows:—

Active service (beginning with 20th year)	3 years
Naval reserve	4 years
Seewehr (corresponding to Landwehr in the Army)—	
First levy	5 years
Second levy	7 years

Naval Ersatz Reserve (Supernumaries).—This is composed of men of the seafaring population or the semi-seafaring population of the Empire. The conditions and period of service are the same as for the Army—*i.e.*, they may be taken for special service in peace time, and in war time they would be taken to fill up vacancies when required. The obligation lasts for twelve years, from October 1 of the year in which the conscript attains his 20th year . . . 12 years

Landsturm—as in the Army—*i.e.*, all not in the Navy from the 17th to the 45th year, of those belonging to the seafaring or semi-seafaring population.

First levy—those from 17th to 39th year.

Second levy—those from 39th to 45th year.

By April 1 in every year the naval stations lay estimates before the Reichs-Marine-Amt (the Imperial Naval Office) corresponding to our Admiralty, stating the number of recruits that will be required for the forthcoming year. By April 15 the Reichs-Marine-Amt forwards to the Prussian Minister of War a statement specifying the number of recruits required for the Navy. The Minister thereupon sends this specification to the various army corps districts.

Standard for recruits. No height measurement is prescribed for the Navy, but men below 5ft. 1⅘in. must be well built, and have a chest of sufficient breadth and depth to be capable of expansion. Unless the physique is otherwise good, the minimum chest measurement of a man must not be less than half his height. The minimum heights required for seamen, in determining their distribution, are as follows:—divisions, 5ft. 5in.; artillery, 5ft. 6in.; marine infantry, 5ft. 5in.

Sources of supply. According to Art. 57, S. 4, the whole seafaring population of the Empire, including engineers and shipwrights, etc., are excused service in the Army, but are obliged to serve in the Navy. With them, also, the liability to serve lasts from the age of seventeen to forty-five, but actually they are only called upon in peace time from the age of twenty to thirty-nine. The recruits of the Navy consist of:—(1) The ordinary conscripts; (2) one-year volunteers; (3) volunteers for three years or longer; (4) boys who volunteer for the Navy.

Conscripts. Conscripts are taken from the seafaring and semi-seafaring population, and, if these are insufficient, from landsmen with suitable qualifications. As a matter of fact, men join the Navy from all parts of the Empire, and those coming from localities situated far inland, who have never even seen the sea, turn out to be very good seamen. Under the head of the "seafaring population" are reckoned:—

(*a*) Seamen by profession—that is, men who have served at least one year on board German sea-going, coast, or harbour ships.
(*b*) Sea, coast, or harbour fishermen who have followed their calling for at least one year.
(*c*) Ships' carpenters and sailmasters who have been to sea.
(*d*) Engineers and stokers for seafaring and river steamers.
(*e*) Cooks and stewards.

Under the head of the "semi-seafaring population" are reckoned:—

(*a*) Seafaring people who have served as such for at least twelve weeks on board German or foreign ships—*i.e.*, A.B.'s, ordinary seamen, boys, engineers' assistants, firemen, coal trimmers, electricians, fitters, plumbers, lamp trimmers, sailmakers, bakers, butchers, barbers, writers, stewards, etc.
(*b*) Fishermen who have followed the calling, regularly or temporarily, for less than one year.

Volunteers.

Volunteers are taken for three, four, five and six years; and boys between the age of fourteen and a half and eighteen who volunteer are taken with a view of being trained as seamen, petty officers, or warrant officers—they belong to the ships' boys division.

Distribution of recruits.

Recruits are all distributed on joining the Navy to the different depôts of the service in which they are destined to serve, namely:—

(*a*) To the Matrosen-Divisionen, *i.e.*, the seamen's divisions.
(*b*) To the Torpedo-Abtheilungen, *i.e.*, the departments for destroyers and torpedo crews on ships.
(*c*) To the Werft-Divisionen, *i.e.*, the department for technical *personnel*, engineers, engineer-artificers, stokers, engine-men, carpenters, etc. All the administrative staff in the Service, including the paymasters, also belong to the Werft-Divisionen.

In effecting this distribution the previous employment of the men is taken into consideration, especially in the case of those who have hitherto served in the mercantile marine.

At the end of the prescribed three years of service the seamen are allowed to re-engage (*kapituliren*), as in the Army; and, if they do, they are styled *Kapitulants*. They are taken on for a year, and may apply to renew their re-engagement at the end of every succeeding year. They receive in such case a special re-engagement grant. Most of them become afterwards warrant officers.

III.—Connection between the Imperial German Navy and the Mercantile Marine.

Mercantile Marine a reserve for Navy.

Owing to the conditions to which every able-bodied German is submitted as regards the obligation to serve in the Army or Navy, the

relations subsisting between the Mercantile Marine and the Imperial Navy are an important factor to take into consideration. In England we have the long-service system, which, from a service point of view, German naval officers would like to have in their Navy. In England the view prevails that most men after serving in the Royal Navy would be unwilling to go sea again in the Mercantile Marine. Besides having the long-service system, we train our men direct for the Royal Navy. From what has been said in these pages on the subject of recruiting for the German Imperial Navy, it will be seen that a certain number of the younger members of the German Mercantile Marine practically receive their preparatory training for the Imperial Navy in the Mercantile Marine. It is important to note that a large proportion of the seamen, on completing their time of compulsory service in the Imperial Navy, return to the Mercantile Marine. Hence this latter service is obviously regarded as a reserve force for the Imperial War Navy, which it actually is.

On January 1st, 1904, the number of seamen engaged in ships of the German Mercantile Marine was 59,689—namely, 3324 in excess of the number on the same date in 1903. With a supply of thoroughly trained seamen such as this, whose names and addresses stand on the lists of the recruiting department of the Navy, together with all particulars as to the capabilities of the men, obtained during their period of service on board the warships of the Imperial Navy, the State can always rely on an efficient reserve of well-trained and reliable *personnel* of a mature type, whilst having besides the ordinary channels from which the country can recruit. The immense advantage of this valuable reserve force, arising from the obligation imposed on the able-bodied male population to defend their country, can nowhere be gainsaid. German Navy enthusiasts affect to think that in this respect the prevailing conditions as regards seamen available as a reserve are far more favourable for the Imperial German Navy than they are for the British Navy.

IV.—Shipbuilding and Private Shipyards.

Commencement of war shipbuilding in Germany.

In 1848, when Prussia commenced her latest era of naval policy, her ships were mainly purchased abroad—in England and France—only a few being built at home. In the latter case the machinery came from England. Up to 1867 only second class gunboats were built in private yards, namely, at the Vulkan (Stettin), Nüske & Co.'s (Grabow) and at Klawitter's yards. In 1869 the Preussen (now the Saturn—harbour ship) was given to the Vulkan Co.; this was the

first time that private shipbuilders in Germany had anything to do with the building of modern German ships of war. In the same year the first ironclad, Der Grosse Kurfürst, was laid down at the Wilhelmshaven yard, which was then in a very incomplete condition; and in 1870 the ironclad Friedrich der Grosse, now a harbour ship, was commenced at the Imperial yards at Kiel—her armour-plates coming from the Vulkan works. It was Admiral von Stosch, the successor of Prince Adalbert, who introduced the idea of giving orders to the representatives of German industry, so that by the end of the 'seventies of last century German shipbuilding had begun to emancipate itself from England. Orders were given between the middle of the 'seventies to the middle of the 'eighties to the Vulkan; the Norddeutsche—afterwards the Germania yards—Kiel; the Reiherstieg yards; the Weser yards; Schichau (Danzig); Möller and Holberg; and Klawitter. In cases in which the yards did not supply the boilers, they came from Egells and Ludwig Löwe.

Foreign orders.

It may be noted also that foreign orders came in to Schichau and Howaldt in 1877, 1878 and 1879. Orders came from China in 1881 and 1883; and, owing to the progress made by the Germania yards in the building of warships, several other orders came in from abroad, notably from Greece, Brazil, and Turkey.

Government encouragement.

In order to encourage shipbuilding in German yards it was resolved in 1879 to allow all materials necessary for shipbuilding to enter Germany duty free. At the same time the German shipbuilding industry developed to such an extent as to be able to compete with foreign firms. Subsequently, in 1885, an Act was passed granting subsidies to steamers, the stipulation being that the vessels had to be built in German yards. These two Acts were followed by those of 1890, 1893, 1898 and 1900. These subsidies are only given to those lines which carry the mails for the Government. The companies have no interest in running the mail boats. The immediate consequence, however, of the Acts of Parliament encouraging shipbuilding was that in 1886 the Vulkan yard (Stettin) received orders from the Norddeutscher Lloyd to build the Preussen, Bayern, Sachsen, Danzig, Stettin, and Lübeck; and this large order was executed so admirably that the Vulkan yard obtained in 1893 the contract to build the Imperial yacht Hohenzollern. In 1888 the Hamburg-American Line introduced the twin-screw type, and gave its orders to the Vulkan yard, and German shipbuilding entered upon a new era.

Shipyards.

In 1890 the building of the Brandenburg class commenced at the Germania, Vulkan, and the Imperial yards at Wilhelmshaven. At the commencement of the 'nineties German shipbuilding had arrived

at a stage of excellence which was universally acknowledged, and the following yards were, and are still, engaged in the building of ships of war; the Imperial yards at Kiel, Wilhelmshaven, and Danzig; Schichau (Elbing and Danzig); the Vulkan, the largest German yard, which has built or is building eight of the twenty-seven battleships; the Germania (Kiel), which has built six battleships, and is to build "Q," one of this year's battleships. Blohm and Voss (Hamburg) till quite recent years built chiefly merchantmen, now warships also. The Weser yards (Bremen) build chiefly third-class cruisers. Destroyers come mainly from Schichau's yards at Elbing, some from the Germania. Battleships are also built at Schichau's Danzig yards. Four of the battleships have already been built, and "R," one of this year's battleships, is to be laid down in these yards. As yet Howaldt's yards only build third-class cruisers.

Further encouragement.

The passing of the Navy Act of 1898 gave more stability to the shipbuilding trade, and the Act of 1900 still further augmented this stability, bringing in new life to this branch of industry. The fixed plan, covering a long period of years, enabled shipbuilders to develop their industry on lines which are economically and technically advantageous to the Empire. Of course this development has not been without its effect on those industries which are connected with shipbuilding.

Subjoined are details of German shipbuilding in private yards in 1904:—

	Tonnage (brutto) of ships completed.	Tonnage (brutto) of ships still building in 1905.
(A) *Mercantile Marine*—		
Blohm and Voss (Hamburg)	23,772	25,740
Reihersteig (Hamburg)	13,545	14,450
Joh. C. Tecklenburg and Co. (Geestemünde)	23,273	21,300
Bremer Vulkan (Vegesack) (all ships constructed of best Siemens-Martin steel)	22,910	40,730
Rickmers (Reismühlen)	9,127	10,950
Weser (Bremen)	1,864	2,110
G. Seebeck (Bremerhaven)	3,316	5,034
Schöner and Jensen (Tönning)	9,370	4,650
Flensburger Schiffbau Gesellschaft	34,730	23,360
Howaldtswerke (Kiel)	14,880	12,045
Germania Werft (Kiel)	1,216	19,680
Henry Koch (Lübeck)	9,743	9,300
Neptun (Rostock)	19,156	25,760
Vulkan (Stettin)	8,865	27,000
Nüske and Co. (Stettin)	2,237	4,250
Stettiner Oderwerke	898	6,640
Schichau (Danzig)	1,294	3,270
Klawitter (Danzig)	2,905	864

(B) *The Imperial Navy*—	Displacement of ships completed.	Displacement of ships still under construction.
Blohm and Voss (Hamburg)—		
Armoured cruiser—		
Yorck	...	9,350
Weser (Bremen)—		
Protected cruisers—		
Bremen	3,200	...
München.	3,200	...
Leipzig, (ex "N")	...	3,200
Armoured cruiser—		
"C"	...	11,322
Germania (Kiel)—		
Battleships—		
Braunschweig	12,997	...
Deutschland.	...	12,997
Hessen	...	12,997
Vulkan (Stettin)—		
Battleships—		
Preussen	...	12,997
"O"	...	12,997
3rd class cruiser—		
Lübeck	...	3,200
Schichau (Danzig)		
Battleships—		
Elsass.	12,997	...
Lothringen (*ex* "M")	...	12,997

Capacity of private ship-yards.

Technically speaking, German shipbuilding has acquired a world-wide reputation. The yards were not fully occupied last year, as can be seen from the above figures, but it was affirmed at the beginning of the current year that prospects were better, and the above table shows that this was the case. Of course a number of orders are anticipated within the near future from Russia. At the Germania yard it is considered that they are in a position to build six battleships at the same time, and that it would be possible to build them quickly, whilst the Vulkan yard, which is building two, is quite capable of building four. That German shipbuilding has not suffered by the depression that has prevailed during the last few years as much as might have been expected is partially due, as already hinted, to the fixed plan for shipbuilding laid down by the Imperial Admiralty in 1900. If they had the orders, fully double the number of battleships could have been laid down in the German yards during these years. Orders have ceased from foreign countries since 1902, but the home orders under the Act of 1900 compensated for this falling off, and also materially assisted those branches of industry that are connected with shipbuilding.

Special attention has been paid of late years at the Royal Berlin Charlottenburg Technical University to instruction in shipbuilding, and a separate department for naval construction has been organised at the new Royal Technical University at Danzig, opened last autumn. It is noteworthy that, although German warships are no longer built

in England, first-class merchant ships, as well as engines, are from time to time ordered by Germany, in order that Germans should be kept in touch with the technical progress of the trade in England.

V.—*MATÉRIEL.*

Battleships.

The Braunschweig and Elsass were completed in October, 1904, and are in commission, the war fleet (*Aktive Schlachtflotte*); the former as flagship of the second admiral of the second squadron. The Braunschweig on her full-power trials attained a speed of 18·3 knots. The Hessen and Preussen, of the same class, will be completed this year (1905); the Lothringen (Ex. M.), which is the last of the Braunschweig type, was launched at Danzig, May 27, 1904.

Deutschland class.

The Deutschland, which was launched November 19, 1904, at the Germania yard, Kiel, is the first of a new class which has the same general features and dimensions as the Braunschweig class, but there are some slight changes in the armament, and the protection is increased. The armament of both classes comprises four 11-in. guns, 40 cal., in pairs, in hooded barbettes; fourteen 6·7-in. Q.F. guns, ten in a central battery on the main deck and four in separate casemates at the corner of the upper deck. The central battery in this type is larger than in the Braunschweig class, and the guns have a greater arc of fire. The position of the four guns in separate casemates instead of in turrets is considered to have the following advantages: first, the firing can be better directed; secondly, the weight is less, of which factor advantage can be taken elsewhere; thirdly, it is possible to mount two 3·4-in. guns on the top of each casemate, whereby the platform of these guns is protected, which was not the case in the Braunschweig class. There are twenty-two 3·4-in. Q.F. guns instead of twelve in the Braunschweig class, and four 1·4-in. (one-pounder machine guns) instead of twelve in the Braunschweig type. There are six torpedo-tubes—one in the bow, four on the broadside, one in the stern—all submerged. As regards the armour, which is all of Krupp steel, the water-line belt has 9·5 in., as compared with 9 in. in the Braunschweig; the upper belt (citadel) 8 in., as compared with 6 in.; central battery 6·7 in., as compared with 6 in.; conning tower (average thickness) 11·8 in. It is not yet known whether "O" and "P" will have the same armour. The tendency now is to increase the thickness of armour. The Deutschland will have three sets of triple expansion engines of 16,000 I.H.P., eight water-tube (Thornycroft-Schulz) and six cylindrical boilers. "O" and "P" of this class, which were laid down in 1904, are to have only one kind of boiler, viz., twelve water-

tube boilers. Speed 18 knots. The coal capacity of the Deutschland is 700 to 1800 tons ("O" and "P" will have 800 to 1800 tons); oil fuel capacity 200 tons.

As regards secondary armament (*Mittel-Artillerie*), the Germans consider it important to have the secondary guns of one calibre, and not divided into two different calibres. As already said, 8·2-in. (21 cm.) guns have not been introduced as secondary armament in the Deutschland; and 6·7-in. (17 cm.) guns are to be used throughout the "N" class. Of course it may be decided to introduce stronger secondary guns for the next type; but there is reason to suppose that the Admiralty would even then adhere to the principle of having their secondary guns of a uniform calibre.

The Deutschland (ex N) type is, from both offensive and defensive points of view, in many details superior to the Braunschweig class. The enlargement of the battery is an improvement, the guns being thus not so close to one another, and therefore less risk is run of their being all put out of action together.

Two battleships of the Deutschland class, "Q" and "R," are to be laid down in 1905 at the Schichau and Germania yards respectively.

Brandenburg class. The four ships of the Brandenburg class—Wörth, Brandenburg, Kurfürst Friedrich Wilhelm, and Weissenburg—were still being subjected to improvements in 1904. The alterations are as follows:—the boilers have been renewed, but the same type has been retained. The ships have also received two additional 4·1-in. (10·5 cm.) guns; and the broadside torpedo tubes are now submerged. The Wörth and Weissenburg were commissioned in September 1904; the Brandenburg will be finished this spring, and the Kurfürst Friedrich Wilhelm in the autumn (1905).

The old battleships—Deutschland, Kaiser, and König Wilhelm, the latter finished in 1869, the two former in 1875, built by Samuda, London—which of late have been used as cruisers, were struck off in May as out of date. They were the last ships of British origin in the German Navy. According to the Act of 1900, every warship must now be built in German yards—at Kiel, Wilhelmshaven, Danzig, Elbing, Stettin, Hamburg, and Bremen.

The four armoured coast defence ships of the Siegfried class—Siegfried, Beowulf, Frithjof and Hildebrand—were taken off the list of the battle fleet in October, 1904. They were put in the Reserve, being replaced by the Elsass and Braunschweig. All eight of this class have been lengthened, and were all ready for sea by the end of the year, but only two of them—Frithjof and Aegir—have been commissioned as yet. They have been moved from the North Sea to the Baltic. A reserve fleet was formed out of coast de-

GERMAN ARMOURED CRUISER "PRINZ ADALBERT."

fence vessels, which is meant as the reserve formation under the Act of 1900.

The armoured cruisers Friedrich Carl (Blohm & Voss, Hamburg), 8858 tons, and Prinz Adalbert (Imperial Yards, Kiel), 8858 tons, made their trial trips last year. The Friedrich Carl attained a speed of 20·53 knots in her mile trials. She took 28 months to build and joined the battle fleet early in 1904 for gun trials. The Prinz Adalbert took 42 months to build. She was commissioned early in 1904 for gun trials. Armoured (large) cruisers.

The views of German naval circles as to the supply and size of large cruisers may be thus summed up: The number must be regulated by the strategic position of the country. The British Navy requires a large number; the *jeune école* in France demands more than is deemed necessary for Germany. The type required for Germany is one that must have great speed, large coal capacity, and suitable armour, and special stress is laid on these vessels carrying a sufficient number of heavy guns. The coal capacity must be much larger than that of battleships, and the armour can be weaker, as the cruiser is not a fighting ship. Thus, the English Duke of Edinburgh, the French Ernest Renan, and the United States Washington types, are considered to be too costly for Germany. The latest type, "C," laid down in 1904, and "D," to be laid down this year, is to have a displacement of 11,319 tons, and will have a speed of 22·5 knots. She is being built at the Weser Yards. The displacement of the large cruisers has been augmented from year to year since 1898, the displacement of "C" and "D" being about 2000 tons more than that of the Yorck and Roon, which will be finished at the end of this year. Their length is to be 449·3 ft. between perpendiculars. German opinion upon.

The Hamburg, the Bremen, and the Berlin were completed in 1904. The Hamburg, 3200 tons, the first of the larger type of small cruisers, made her trials early in 1904 and attained a speed of 23·28 knots, and the München (ex M), which made her trials in February, and the Lübeck will be completed in 1905. The Bremen and Lübeck made their trials later in the year, and the Berlin does so in the spring of this year. The Lübeck and Berlin are substitutes for the Merkur and Zieten respectively; the Hamburg, Bremen, and München are additional ships. The Lübeck, which makes her trials in April, has been provided with Parsons' turbine engines instead of with the usual reciprocating engines. Her trials commenced early this year (1905). The results will be of special interest, first, because they are meant to determine the precise advantages of the turbine engines; and secondly, because a comparison will be possible Third class (small) cruisers.

between her and H.M.S. Amethyst, which is a vessel of the same size.

The substitute Meteor, substitute Alexandrine, and additional cruiser Leipzig (ex "N,") of the same type as München, Lübeck, and Hamburg, were laid down respectively at the Imperial yards, Kiel, the Imperial yards, Danzig, and at the Weser yard, Bremen. According to the 1900 programme, one additional and two substitute third-class cruisers will be laid down in 1905. The first vote is taken in the Estimates for these as "O," Ersatz Wacht, Ersatz Blitz.

Importance attached to this type.

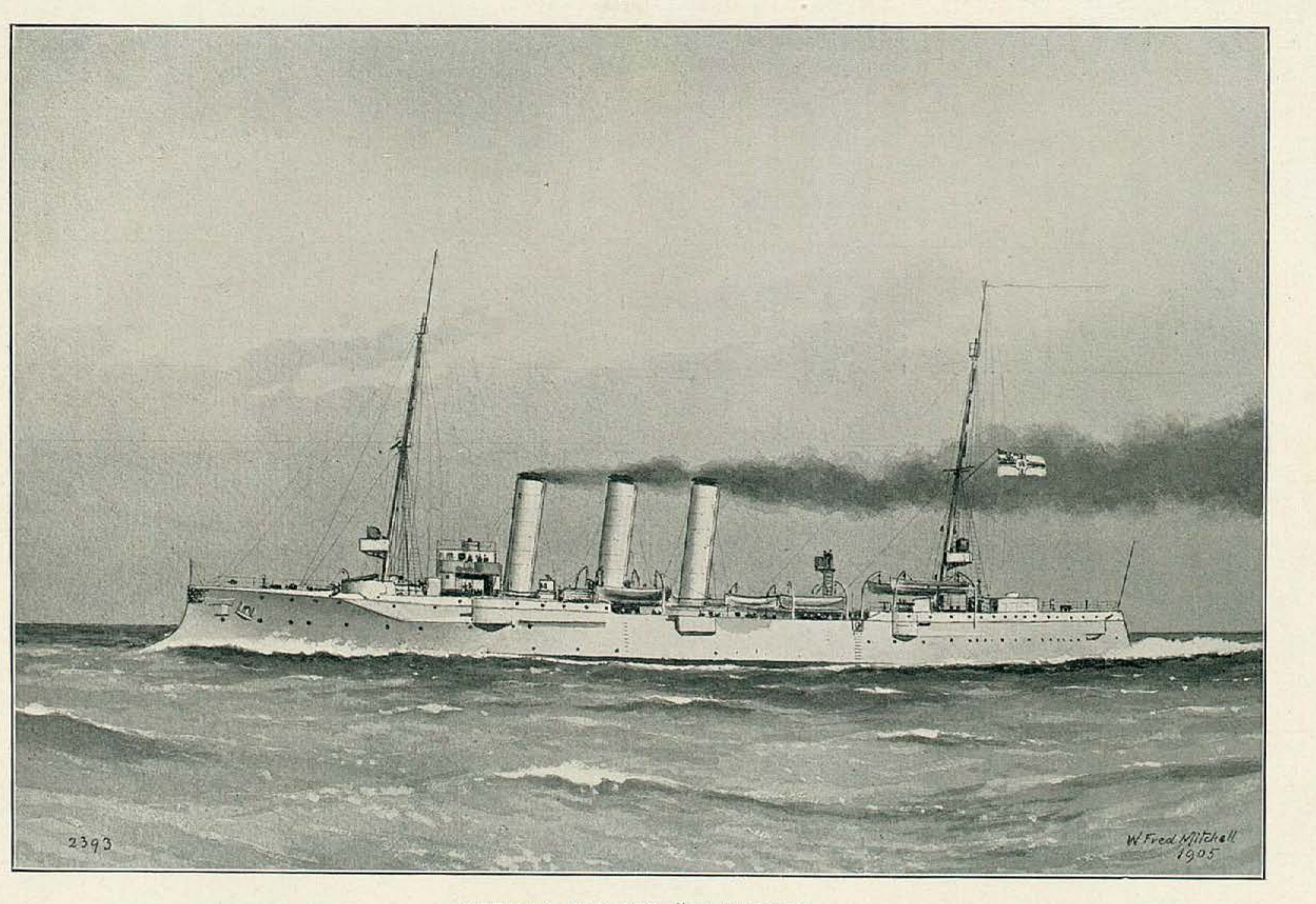
The Admiralty considers it important for the German Navy to be provided with a sufficient number of small cruisers as being specially qualified for pursuing and engaging destroyers and torpedo boats and for carrying despatches. Special attention is therefore being paid, and will continue to be paid, to this type of vessel. They are being compared with our scouts. It is pointed out in German naval circles that the main difference between our scouts and the German type is that our scouts have only a small coal capacity, whilst the German third-class cruisers have a relatively large coal capacity. On the other hand, our scouts have a greater speed, viz., up to 25 knots, whilst this German type have only one of 23·5 knots, but this speed will be increased up to 24 knots at least. The German third-class cruisers also have two torpedo-tubes submerged, whilst our scouts have them above water; and the artillery in our scouts is of smaller calibre.

The following are their leading features:—Displacement, 3200 tons; length, 341 ft.; beam, 43·29 ft.; draught, 16·4 ft.; speed, 23·5 knots; I.H.P., 11,000; coal capacity, 800 tons; steaming radius 5000 miles; boilers, as in all the smaller cruisers, ten water-tube (Thornycroft-Schulz). The armament comprises ten 4·1-in. Q.F. guns; ten 1·45-in. (1-pdr.) guns, and two torpedo-tubes, 18 in., submerged. The armoured deck is 2 in. thick.

Destroyers.

Six destroyers (120–125) were completed at Schichau's yards, Danzig; six more (126–131) were laid down also at Schichau's yards in 1904, according to the programme, and six more will be laid down this year. The displacement of German destroyers is now 420 tons; speed, 30 knots. They carry three 18-in. torpedo tubes, all above water on deck. I.H.P., 6500. Measurements: length, 198 ft.; beam, 22·9 ft.; draught, 5·9 ft. Destroyer 125 is provided with Parsons' turbine engines as an experiment. During her trials an accident happened to her air-pump, so that they had to be postponed till the spring of this year.

The river-boat, presented to the Empire by the German Navy



GERMAN CRUISER "HAMBURG."

League (Flotten-Verein), was finished by the end of 1904, and joined the Tsingtau in the Yang-tse river.

Ship-building programme.

The shipbuilding programme for this year (1905) is thus according to the Navy Act of 1900:—two additional battleships, "Q" and "R"; one additional armoured cruiser, "D"; one third-class (small) cruiser, "O"; two substitute third-class (small) cruisers, six additional destroyers. And the following also figure in the Estimates:—one large mining vessel, one gunboat, one river gunboat for China, one submarine.

Imperial dock-yards.

Since 1900 the Imperial yards have been considerably enlarged, and new docks have been constructed. A large sum of money has been expended in the erection of electrical plant. In the Act of 1900, 270 millions of marks (£13,705,305) were allotted for docks and harbour works for the period 1901–17; of this sum £3,357,807 were expended from 1901–4 inclusive.

The number of men employed in the twenty largest private shipyards was 53,256 in 1903; in the same year the average number employed at the Imperial dockyards at Kiel, Wilhelmshaven, and Danzig was 17,489. The percentage of workmen at the Imperial yards receiving wages per annum at under £50 was 13·2 per cent. at between £50 to £75, 80·8 per cent.; at over £75, 6 per cent.

Docks existing.

The following table shows the number of dry docks and floating docks at the various yards:—

	Dry Docks.	Floating Docks.
Imperial Yards at Kiel	6	2
,, ,, Wilhelmshaven	3	2
,, ,, Danzig	—	1
Blohm & Voss (Hamburg)	—	4
Brandenburg	—	1
Flensburger Schiffbaugesellschaft	—	1
Howaldt's Works, Kiel	—	3
Klawitter, Danzig	—	1
Henry Koch, Lübeck	—	2
Neptun, Rostock	—	1
Reiherstieg, Hamburg	—	2
F. Schichau, Elbing	—	2
Seebeck, Bremerhaven	5	—
Tecklenborg (Geestemünde)	1	—
Vulkan, Stettin	—	2
Weser, Bremen	—	2
	15	26

The following are in course of construction:—

Imperial Yards, Kiel	—	1
,, ,, Wilhelmshaven	3	—
Weser, Bremen	—	1
	3	2

A large sum is being spent on docks at Wilhelmshaven—£2,730,494 has been set apart for dry docks and dockyards—*cf.* Navy Act, 1900. Extensions and arrangements are being made for the eventual

accommodation of the whole German Fleet. The three docks above mentioned as under construction are for vessels of the largest size, and a very large basin is being constructed for destroyers. Of the three existing dry docks at Wilhelmshaven, two are 426 ft. × 69 ft. over all, and one 377 ft. × 59 ft. over all; the three new ones in course of construction being 584 ft. × 101 ft. over all.

By referring to the table of measurements of the German battleships it will be seen that there are as yet no docks at Wilhelmshaven capable of containing the largest battleships, such as those of the Braunschweig class; and indeed those of the Wittelsbach class can only just be accommodated there. But the new docks will afford more than ample room. At Kiel there are docks existing capable of containing two of the larger and four of the smaller battleships. The extensions being made at Kiel are also noteworthy.

Expenditure on new works.

It is pointed out in the section on the Estimates that the vote for the maintenance of the Fleet and dockyards for 1905 amounted to £1,293,876, showing an increase of £59,328 over 1904. The following details selected from the Extraordinary Estimates for Harbour Works are instructive :—

	Estimated Cost.	Estimates 1905.	Estimates 1904.	Already Voted.	Amount still to be Voted.
	£	£	£	£	£
Kiel—					
Two large dry docks . .	832,110	44,053	58,737	788,057	—
Enlargement of dockyards	500,244	71,120	132,159	425,845	(3,280 balance paid from sale of 4 steamers)
Floating dock for destroyers	24,473	9,789	14,684	14,684	—
Wilhelmshaven ·					
Three large dry docks .	699,951	161,527	88,105	367,107	171,316
Enlarging dockyards. .	1,603,034	190,895	146,838	386,696	1,025,443
Construction of quays for landing destroyers . .	250,611	78,313	48,946	97,892	74,406
Reclaiming land south of Ems-Jade Canal for extension of dockyards	176,896	58,735	24,473	24,473	93,688
Danzig—					
Improvement of dockyards.	115,027	36,710	36,710	63,630	14,687
	4,202,346	651,142	550,652	2,168,384	1,382,820

(Converted at £1 = Mks. 20·43.)

VI.—Navy Estimates for 1905–6.

April 1, 1905–March 31, 1906.

Subjoined is a summary of the German Navy Estimates as accepted by the Reichstag in March, 1905.

	1905.	1904.	Increase or Decrease.
Recurring Expenses—			
Administrative Department (excluding Mks. 96,305 (£4717) for Kiao Chao)	£ 5,137,060 (M.104,950,126)	£ 4,856,607 (M. 99,220,486)	£ + 280,453
Non-Recurring Expenses—			
Shipbuilding	3,366,128 (M. 68,770,000)	3,388,888 (M. 69,235,000)	− 22,760
Armaments—Artillery, Torpedoes, Mines	1,605,042 (M. 32,791,000)	1,258,247 (M. 25,706,000)	+ 346,795
Special Non-Recurring Expenses .	329,880 (M. 6,739,450)	290,013 (M. 5,924,970)	+ 39,867
Extraordinary Estimates	986,735 (M. 20,159,000)	774,350 (M. 15,820,000)	+ 212,385
Total	11,424,845 (M.233,409,576)	10,568,105 (M.215,906,456)	+ 856,740

(Converted at £1 = Mks. 20·43.)

Of this sums Mks. 46,939,000 (£2,297,552) are to be covered by a loan.

There is an increase in all the above-named items as compared with 1904. The following increases in the Recurring Expenses deserve special attention :—

1. An increase of £103,709 in the vote for Pay, which is due to the increase of the *personnel* by 2715.
2. An increase of £59,328 in the vote for Maintenance of Fleet and Dockyards.
3. An increase of £42,866 in the vote for Ordnance Department and Fortifications.

Ship-building.

In the vote of £3,366,128 for new construction are included :—(1) The final votes for the battleships Preussen and Hessen, for improvements to the ships of the Brandenburg class, for the armoured (large) cruiser Yorck, the third-class cruisers München and Lübeck, and for six destroyers (one division); (2) third votes for battleships Lothringen and Deutschland; (3) second votes for battleships "O" and "P," armoured (large) cruiser "C," third-class cruiser "N," third-class cruisers (substitutes Alexandrine and Meteor); (4) first votes for battleships "Q" and "R," armoured (large) cruiser "D,"

third-class cruisers "O," Ersatz Wacht, and Blitz, and for six destroyers (one division); (5) fourth and final votes for construction of cooling arrangements for ships' magazines, a tender (substitute Hay), vote for surveying vessel, first vote for mining vessel, vote for experiments with submarines (£73,421)—one submarine at least will be built, and the question of building more will depend upon the success of this one.

Armaments.

The vote for armaments is:—

	1905.	1904.	Increase.
	£	£	£
Ordnance	1,371,072 (M. 28,011,000)	1,102,594 (M.225,260,000)	+ 268,478
Torpedo Armaments	218,306 (M. 4,460,000)	155,653 (M. 3,180,000)	+ 62,653
Mines for Mining Vessel	15,664 (M. 320,000)	—	+ 15,664
Total	1,605,042 (M. 32,791,000)	1,258,247 (M. 25,706,000)	+ 346,795

The items which are outside the Act of 1900 are: a gunnery tender, a surveying vessel, a large mining vessel, and experiments with a view to building submarines.

In view of the experience of the Russo-Japanese War, a vote is asked for the formation of a special corps for the purpose of laying out and removing mines (*Streuminen*), as well as for the construction of the mining vessel just mentioned. The mining corps is to be quartered at Cuxhaven. It will consist of six petty officers, forty-five non-commissioned officers, sixty-one A.B.'s, 188 ordinary seamen; total, 300.

In order to deal with torpedo attacks, it has been found necessary to increase the light armament of battleships and cruisers.

Steel projectiles.

It is intended to increase the supply of steel projectiles owing to the increased amount of armour protection afforded to ships, and the increasing range of guns. The ammunition supply will not be increased, but the supply of steel shells will be greater than that of ordinary shells. Steel projectiles are considered the most suitable form of projectiles for this purpose. They are, however, very expensive, and consequently involve a heavy outlay. The ammunition vote has doubled, being £97,893, as compared with £48,946 in 1904.

Torpedo armaments.

There is an increase in the cost of torpedo armaments in all classes of vessels under construction. The destroyer has almost doubled the cost of the guns and torpedo armaments. German boats carry only three 1·96-in. guns, whilst English boats carry one 3-in.

bow gun and five 2·24-in. broadside guns. Germany is therefore going to have a heavier gun in her destroyers. The destroyers will not carry more torpedo tubes, but will carry an extra Whitehead torpedo, *i.e.*, six instead of five.

Wireless telegraphy in the dockyards.

The wireless telegraphy fittings in the dockyards will be completed this year.

New revolver for the Navy.

Magazine revolvers are to replace the old revolver for the landing corps of ships at a cost of £17,126, as first vote. The new revolver is the so-called "Parabellum" revolver (Borchert-Luger).

Prizes.

About £300 is asked for prizes for rifle-shooting, and about £180,000 (an increase of about £20,000) has been asked for for target practice for naval detachments and ships in commission, for other expenses connected therewith, and for shooting prizes for the guns' crews and for men attending the range-finders (the item for prizes for the latter is new). There is also an item for about £15,000 for torpedo practice, explosives service, wireless telegraphy exercises, and for prizes for captains of the torpedo-tubes, and an item of about £8000 for torpedo experiments.

Target practice, torpedo practice, etc.

Secret Service Fund.

The Secret Service item amounts to about £6500, which is at the exclusive service of the Secretary of State; and £700 is to be placed at the disposal of H.M. the Kaiser.

Extraordinary Estimates.

Harbour works.

The vote for Harbour Works and Docks amounts to £877,092 (M. 17,959,000), as compared with (in 1904) £737,640, an increase of £139,452.

Fortifications.

The vote for Fortifications amounts to £107,684 (M. 2,200,000), as compared with (in 1904) £36,754, an increase of £70,930. The total of the Extraordinary Estimates is :— 1905, £986,735 (M. 20,159,000), as compared with, 1904, £774,356—a net increase of £212,379.

The dry docks and dockyard extension works, as well as the floating dock for destroyers, at Kiel, and the floating dock and new gunnery station at Sonderburg, will be completed this year.

All votes for dockyards extension, harbour works, and barracks, have been increased this year.

The improvements to the Lower Elbe fortifications will be completed; and a new battery is to be constructed, in order to strengthen the fortifications on the Elbe, at a cost of about £80,000.

The disposition of the guns of the two Kiel Harbour forts is to be altered at a cost of about £22,100.

From the subjoined table it will be seen that, although this year's Estimates exceed those foreshadowed by the Act of 1900 for 1905 by 503,277 marks (£24,634), the sum total charged in the Budgets of the financial years from 1900–1905, is about Mks. 5,500,000 (£269,212) less than was estimated under the Act for this period.

Financial year.	Estimates according to the Act of 1900.		Sums actually entered in the respective Budgets.	
	£	Mill. of M.	£	Mill. of M.
1900	—	—	176,211	3·6
1901	9,821,830	200·7	9,535,000	194·8
1902	10,396,475	212·4	10,048,948	205·3
1903	10,655,848	217·7	10,406,265	212·6
1904	10,621,634	217 0	10,543,318	215·4
1905	10,905,531	222·8	11,424,845	233·4
	52,401,318	1070·6	52,134,587	1065·1

CHAPTER X.

The Campaign of Trafalgar.

The celebration during the present year of the victory of Trafalgar makes it appropriate that the *Naval Annual* should review the lessons which may still be drawn from the great naval campaign which ended with the triumph and death of Nelson. We are now far enough from the time of that memorable conflict to make it possible to enter upon this profitable study without any fear of opening old wounds or offending the susceptibilities of our gallant adversaries of those days who are our good friends in these. There are lessons of the campaign valuable alike to them and to ourselves. My purpose is to write of the operations from a somewhat new point of view, dealing with conditions, causes and effects, rather than with the events of the war, which are mostly well known, and to present the subject in such a way as to reveal the reasons for victory on the one hand and for failure on the other. It is necessary to regard naval operations in their just relations and true perspective; and, if it should seem that there is suggested any revision of former judgments, it must be remembered that Nelson and his companions—for I have not in view Nelson alone—belong to history, and that their achievements are a heritage which it behoves us rightly to understand.

Causes of the outbreak in 1803.

It is necessary to say something—but that shall be done briefly—concerning the causes that led to the rupture of the Peace of Amiens in 1803. As is well known Thiers, Armand Lefebvre, Bignon, Albert Sorel and other eminent French historians lay the whole blame for the fresh outbreak of war at the door of England, while most English writers, and some French thinkers, like M. Coquelle, in his recent "Napoléon et l'Angleterre," ascribe the new appeal to arms to the overmastering ambition and unchanging purposes of Bonaparte. The treaty had given great dissatisfaction in England. Much blood and money had been expended for very little, and the danger we had striven to avert was existent still. France meanwhile was ringing with the sound of a diplomatic triumph, for she was left unshorn by the reverses of the war; Elba and Piedmont

were annexed to her dominions; the States of Parma were occupied; the Presidency of the Italian Republic was Bonaparte's; Holland was a vassal; Germany was partitioned; Austria, our ally, was crushed and broken; Switzerland was compelled to submit to the mediation and protection of France, and Louisiana had been wrung from the feeble hand of Spain. Nothing had occurred to divert Bonaparte from his dream of a world dominion; and Talleyrand remarks that after the signature of the Treaty he abandoned moderation and sowed the seeds of the new wars which were to overwhelm Europe, and bring him ultimately to his ruin. Bourrienne says that he neither expected nor desired a long peace. A few hours after the signature of the Treaty of Campo Formio (October, 1797), he had written to Talleyrand that the British Monarchy must perish or France herself be destroyed. He was accustomed to say that the advantages of peace were only conditional so long as England could throw her Navy and the influence of her gold into the scale.

Objects Bonaparte.

The pretensions of Bonaparte in the Italian Peninsula and in the Mediterranean Islands, the Levant and Egypt, were constantly in the minds of English statesmen and seamen, and served to influence the action of Nelson in a very critical moment of the Trafalgar campaign. Sebastiani's extraordinary mission, and the publication of his remarkable report, revealed the nature of the First Consul's purposes. They were revealed not less by the mission of General Decaen, as an *agent provocateur* and Captain-General of the French forces in India. So undisguised were the Consul's intentions that the British Mediterranean Squadron was maintained practically on a war footing during the brief period of peace. Malta stood in the forefront of the diplomatic argument, and was of capital importance in the circumstances that led to the rupture. India might be the ultimate object and Egypt the penultimate, but Malta was the ante-penultimate. When the invasion of Egypt was in hand the island had assumed the utmost importance to Bonaparte. Whitworth, writing to Sir John Warren in March, 1803, spoke of it as the "watch-tower of Egypt," and Nelson described it as "a most important out-work of India." To the Mediterranean, it was said, must Bonaparte inevitably incline.

Alliances necessary to France.

Yet, strenuous as were the First Consul's demands that we should surrender Malta to the Knights, none knew better than he that the propitious hour he looked for had not struck, and he feared lest England should seize the initiative, which his experience of armies had shown him was the beginning, middle, and end of success in war. Whitworth, writing on March 3, 1803, spoke of Napoleon's "want of means to engage in maritime war; the dispersed situation of what

remains of his Fleet, his projects in America and the West Indies unaccomplished; the wretched state of his finances." But the First Consul—and this is a point of great moment to be noticed—never contemplated encountering England single-handed at sea, nor at all within the considerable period which he thought necessary for his preparations. In an undated memorandum for Decrès, Minister of Marine, ascribed in the "Correspondance de Napoléon" to February, 1802, between the signature of the preliminaries and the ratification of the Articles of Peace, he declared that it would be chimerical to believe that France alone, for ten years to come, could possess a Fleet equal to that of England, while to attempt the provision of such a force would be to compromise her continental position without securing the required predominance. What he hoped was within that period to fight with reasonable chance of success in alliance with Spain and Holland. He held that he was justified in compelling the maritime nations to take up arms against us, but found that Holland did not at first prove submissive, and that Spain, though she had entered into an offensive and defensive alliance with France by the Treaty of San Ildefonso, 1796, shrank from entering into the conflict.

The radical weakness of the French Fleet.

I may now refer to a cause of the failure of the French which has not occupied a sufficiently large space in our histories. I refer to the grave malady which had afflicted the French Fleet—the deplorable condition in which it was found at the outbreak of war, and which clung to it to the end. There were causes for the defeat which were very deep-seated, and in many respects remote from the sounding events of which we read. They must be sought in the strength of one fleet and the weakness of the other—strength and weakness both moral and material—preparedness in one and unpreparedness in the other, moral confidence in that which was to be victorious, dismay and discouragement in that which was to be vanquished. Here, I think, is the great lesson to be learned from the Trafalgar Campaign, and St. Vincent who prepared, and Nelson and his comrades who wrought, speak to us with no uncertain voice across the century that intervenes.

The First Consul was exasperated beyond measure at the untoward turn which events had taken. Not only was the French Fleet dispersed; it was in a state that all who saw it united in speaking of as deplorable. Never within living memory had it fallen so low. The ships were crank, rotten, and reeking with disease; they were undermanned, and the men mutinous and unpaid; the officers were demoralised; and the responsible chiefs were long unable to cut their way through the tangled brake which had sprung up in the

rank soil of corruption and neglect, and in the waste that had been left by the ravages of revolution, and the destruction of disastrous war. The old body of officers had been broken up, and their successors, mostly drawn from the mercantile marine, had had little experience of ships of war, and not seldom gained their first notions of naval tactics in the presence of the enemy. They knew little of the command of men, and Maillot, who had been a naval administrator in Egypt, said they had not thrown off the habit of mind of the trader. Captain Trullet, commanding the Timoléon in the Battle of the Nile, said many of them were rank cowards, their poltroonery affecting the men, and he had seen them escaping from their ships when they should have been fighting the enemy. When Ganteaume returned from Egypt in 1801, he reported that his men had received no pay for fifteen months, and were naked or in rags, half fed, discouraged, profoundly miserable and discontented; while their officers, deprived of pay and allowances, lived in such sordid conditions that they were debased in their own eyes, and received no respect from their men. At Toulon, debauchery, fraud, and theft completed the demoralisation. Ganteaume, then naval prefect, endeavoured to scourge the offenders, when, accompanied by gendarmes, he entered the gaming houses and houses of ill-fame, to find them escaping ashamed through the windows. Among the men the Jacobin spirit was encouraged by the revolutionary clubs, and they were in open revolt against their officers. In Humbert's ships, in the disastrous expedition to Ireland, mutiny had been rife, and when Bompard put to sea, his unpaid men had risen in revolt, surrounding their officers, and he himself had to cut his way through with his sword to see the ringleaders put in irons.

Situation of the dockyards.

The dockyards were in a deplorable situation also. "The magazines are empty, nor is it possible to find either money or credit to fill them." Owing to the unwise economies of Decrès, Toulon lived from hand to mouth, and the stores of wood were reduced almost to the point of exhaustion, while of the five building ships three were rotten and needed to be renewed. Caffarelli, when appointed naval prefect at Brest in July, 1800, reported that the stores of material were all depleted, contractors and men unpaid, and food scarce. The port was no longer what he had known it. "Il manque de tout." In January, 1803, when war was imminent, everything remained to be done. The gun-mountings in the forts were rotten, the guns of calibre too small, the gunners altogether insufficient in number, and utterly unskilled. In the arsenal labour was scarce, and little could be done. So bad was the state of affairs that he could conceive nothing worse. Never had there been such

complete abandonment of Finistère. "Cet état est affligeant; cet état fait pitié; toujours des contrariétés!" The condition of the squadron had never been so bad since 1793. Rear-Admiral Dordelin had but three ships of the line under his orders, one of them valueless, and even these were undermanned, though he was constantly urged to impossible action by the First Consul when the war began. To further complicate the situation the Chouan rebellion was a terror in the neighbouring country, and infected the arsenal with disloyalty, which culminated in an attempt, a few months later, to burn the Patriote as she lay in the dockyard at Brest.

Situation of the Fleet.

These are facts of capital importance in a study of the campaign of Trafalgar. The desperate malady which affected the French Navy was ominous of failure, and was beyond the power of Napoleon to cure. "C'est la marine qu'il faut rétablir," he wrote to Decrès in February, 1803; "toutes les heures perdues dans l'epoque où nous vivons sont une perte irréparable." Yet, inspire the Fleet as he might, with a new impulse; increase its strength, as he did by unremitting energy, until it became a force which seemed to him to promise certainty of success; replace, as he might, sloth by action, and neglect by energy, and fill every port as he did with preparation for war, he could neither invest it with the will to strike, nor conjure away the effects of the desperate malady that had afflicted it. Napoleon never understood naval warfare; it seemed to him that ships of war could be moved like armies in the field. He knew nothing of the compressing power of a blockade; he thought it possible to dare and yet not to risk. Yet, there was grandeur as well as dexterity in his plans, and it may be admitted that if his Fleet had been the efficient instrument of his mind, it might even have come within measurable distance of success.

The British Navy—a contrast.

The British Navy had passed through a great crisis also, but it had weathered the storm of the mutinies of Spithead and the Nore, and, though the United Irishmen were still active, the Fleet was in a large measure purged of its discontent. The scandals of the dockyard had been revealed, and, if they were not cured, they left those establishments efficient in the exigency of war, as was demonstrated by the triumphant success of their work throughout the whole period of hostilities. As Nelson said, in seconding the Address to the Throne, on November 23, 1802, war had not exhausted our resources. The discipline of the Fleet, said St. Vincent, began in the wardroom —it begins there still—and the splendid efficiency of our officers in 1803–4 was due in no small measure to his inspiration and example. Neither officers nor men were demoralised by defeat, but inspired instead with a spirit of confidence and daring begotten of the upright

dealing of St. Vincent and the lofty patriotism of Nelson. There were admirals like Cornwallis and Keith, who maintained all the traditions of the Service; captains like Hardy and Berry, like Brisbane and Durham, who displayed qualities which had never been exceeded; young officers who for courage and enterprise had no equals. In these directions we discover the reasons for our readiness and efficiency at the very beginning of the war. Evils which had nearly destroyed the French Navy left the British Navy almost unscathed.

The victory of Trafalgar had nothing about it in the character of a phenomenon. It was the logical and necessary outcome of these antecedent conditions. Its deepest root lay in the radical unfitness of the French Fleet, and in the weakness of a naval coalition. But these would have availed nothing for our advantage if they had not been matched by naval efficiency, which provided the great organisation of blockade, and animated the action of officers who allowed no opportunities to escape. Nelson undertook the blockade of Toulon, and carried it through with enduring stringency, having no dockyard behind him, and no base, except such as he could himself improvise. It was never his object to institute a close blockade. Rather, he hoped to tempt the French to leave the port, giving him the great opportunity he desired. As we all know, they ultimately eluded him, and he was deceived as to their purpose, but, once assured of the direction they had taken, he never lost his grasp. But Nelson was only one of many who had their share in the victory.

I will claim a high place for the indefatigable Cornwallis, who united to intrepid courage and administrative power, to sleepless vigilance and unfailing endurance, a genius for command that places him among the greatest of our officers. We must never forget that his masterful combinations in the blockade of Brest and the ocean ports were a prime factor in the Trafalgar campaign, and, in fact, that before Villeneuve was defeated, they had made ineffectual all the subtle planning of Napoleon. Nor must we forget the statesmanlike Pellew, who kept watch over the French who had escaped from the West Indies into Ferrol and Corunna; nor his successor, the resolute Cochrane, nor the other admirals who were concerned in the ocean blockade. Equally worthy to be remembered are the captains of Nelson and Cornwallis; among the latter, men like Peter Puget, Patrick Campbell, and Charles Brisbane, who, but for a paralysing chill from the Admiralty, would have carried through, as all who were privy to their purpose believed, a most daring project for burning the whole French Fleet in the harbour of Brest. With them we should link half a hundred young officers, who were concerned in

the rigorous work of the blockade, and in breaking up all the combinations of the "invasion flotilla."

The blockade of the French coasts.

On May 18, 1803, Nelson hoisted his flag on board the Victory at Portsmouth, and two days later put to sea, leaving the Victory temporarily off Brest with Cornwallis, who had already instituted the blockade of that port, proceeding himself in the Amphion. Early in July he was off Toulon with nine ships of the line, some of them very foul and weakly manned, but though the French were rapidly increasing their forces under the energetic impulsion of Latouche-Tréville, he maintained a stringent blockade with a squadron generally inferior in numbers. Reinforcements seldom reached him, supplies were scarce, and everything had to be improvised, including the base at Maddalena. The utmost care was devoted to victualling, the ships were kept clean and sweet, and, though the service was exceptionally difficult, the fleet off Toulon was healthy and daily growing in efficiency. I do not intend to relate the story of the blockade of Toulon, for it is told in Nelson's letters, and in all the naval histories. Off Brest was Cornwallis, with his rendezvous near Ushant, vigilantly observing the operations of the enemy's growing squadron, and standing in often to the Black Rocks. The in-shore squadron, at first under Rear-Admiral Campbell, and subsequently of Collingwood, Graves, and other officers, maintained a close blockade, while the force off Ushant was maintained in a state of complete readiness through a system of reliefs admirably organised as in the previous blockade. Cornwallis also kept a close watch upon Lorient and Rochefort, varying and strengthening the ships off those ports as the need changed. It had been intended that Sir Edward Pellew should take his station off Rochefort, but the squadron of Admiral Bedout, from the West Indies, comprising many ships which were afterwards engaged at Trafalgar, including the Duguay-Trouin—which we still possess as the Implacable—escaped into Ferrol and Corunna, mainly owing to misdirection from the Admiralty, where the belief was entertained that the squadron was intended for the Mediterranean. It thus became necessary for Pellew to institute a blockade of those Spanish ports, where his relations with the Spanish authorities, though very difficult, were conducted with studied politeness and diplomatic skill. In this way was the blockade of the French ports, and of the ports where French ships had taken refuge, instituted and rigidly maintained. The hardships of the winter, especially to the squadrons under the orders of Cornwallis, were extremely great, and were new proof of the endurance, skill, and knowledge of British seamen.

There was no certainty in the minds of British statesmen and

Ideas as to Bonaparte's intentions.

seamen as to the actual intentions of Bonaparte, and, as Nelson said, "the world attaches wisdom to him that guesses right." Very little value was assigned by our officers to the famous invasion flotilla which the French were so energetically but so vainly building, and endeavouring to concentrate in the ports of the Channel. Nelson took station at first to the westward of Toulon, thinking the French were bound out through the Straits, probably to Ireland, though when, later on, Villeneuve put to sea, he had taken another view, and imagined they had gone to the Levant. The orders to Cornwallis off Brest, and Gardner at Cork, all indicated Ireland as the probable object. Nelson expected the French ships from Ferrol in the Mediterranean. Pellew thought their proximate object was one of the French ocean ports. Captain Whitby, who had commanded the Belleisle in the Mediterranean, and who did not think Nelson's dispositions the best for holding the French Fleet at Toulon, expected the fleet to escape from that port, to release the ships at Cadiz, Ferrol, and Corunna, and to appear off Brest some morning, constituting, with the ships in the port, a total of forty-one sail of the line. Lord Melville, First Lord of the Admiralty, thought any ships escaping from Brest might be intended to release those at Rochefort and Ferrol, with the purpose of crushing Nelson in the Mediterranean, but he had in view the possibility of enterprises being attempted at the Cape of Good Hope or in the West Indies. Cornwallis was right in thinking it desirable to keep both these contingencies in view, and the possibility of an expedition to Ireland as well, which was done.

One of my purposes is to show how the compressing force of the great blockade continually frustrated the plans of Bonaparte, and constantly compelled him to change them. He deplored the want of admirals, and leaned mostly on Ganteaume and Latouche-Tréville. The former, when he assumed command at Brest, was, like his predecessors, Dordelin and Truguet, exhorted to lose no opportunity of exercising his squadron, which was frequently to get under way, and continual training was to give experience to officers and men, however much the *mirliflores* of the squadron might laugh at the exercises. Similar instructions were given to Latouche-Tréville at Toulon, but such movements were exceedingly difficult and dangerous in the presence of an active and vigilant enemy. That the possibility of an invasion of Ireland was taken into consideration is certain, and as Lord Melville pointed out, the disaffection of the island might offer opportunities, but previous experiences had not been encouraging, and in March, 1804, Caffarelli, Naval Prefect at Brest, was ordered to retard any preparations in this regard for the chartering of trans-

ports, under various pretexts, without revealing the probable intention of abandoning the project.

In the early months of the war Bonaparte was chiefly occupied in mustering an army, and providing means for its transport, intended for the invasion of England. The project had seemed *extrêmement hardi, extrêmement périlleux,* to Ganteaume, and the famous declaration of Bonaparte, "Que nous soyons maîtres du détroit six heures, et nous serons maîtres du monde," was proved to be an idle dream. When Forfait wrote to the First Consul describing the redoubtable qualities of the flotilla, Decrès, Master of Marine, did not hesitate to describe his assertions as monstrous, and his ideas as absurd paradoxes invented by one who had never left the shore nor ever heard the whistle of a bullet. As a matter of fact, the plan failed completely and in every part. There were inherent difficulties in creating and concentrating such a flotilla in the presence of a vigilant and enterprising adversary, and not less in moving the boats in the ports and harbours and embarking the troops, and early in the year 1804 it was borne in upon the mind of Napoleon that the movements of the flotilla must, at least, be dependent upon some temporary or local command of the sea, in gaining which the Fleet must be employed. I dismiss from consideration the view, supported by Metternich, Miot de Mélito, and latterly by Capt. Desbrière, that the flotilla was a gigantic feint or piece of "bluff." The whole of the correspondence of Bonaparte, not less than the vast efforts that were made, goes to prove that the attempt was serious, and that it failed owing to the effective character of the blockade. It was ever the policy of Bonaparte to represent plans which miscarried as never having been intended to succeed.

The "invasion flotilla."

In December, 1803, the First Consul had outlined to Ganteaume, still Prefect at Toulon, certain ideas concerning the operations of the Fleet in protecting the work of the flotilla, while preparations for an expedition to Egypt were to cover the departure of the Toulon Squadron, all being contrived to make Nelson believe the latter had gone to Alexandria. In the following May certain ideas were outlined for the guidance of Latouche-Tréville, commanding at Toulon, who, deceiving Nelson as to his object, and leading him to think it was Egypt, was to approach Cadiz, releasing the Aigle, which was blockaded there, and then effecting a junction with the Rochefort Squadron, was to appear in the Channel. Collingwood, at the time, entertained little doubt that the Rochefort Squadron could get away, and Calder was afraid lest he might be caught between that force and one escaping from Brest. But Ganteaume, when he assumed command at the latter port had everything to prepare. The ships

Nelson off Toulon.

were increased to twenty-one sail of the line, but they were undermanned, soldiers and labourers had to be embarked, and he could not move. Latouche-Tréville died at Toulon on August 19, 1804, having done much to animate his squadron, and having cut some of those "capers" outside the port which had so exasperated Nelson. Notwithstanding the extreme anxiety of Bonaparte to deceive the great admiral, the latter had partially divined his purposes in September, 1804. "Suppose this Fleet escapes, and gets out of the Straits, I rather think I should bend my course to the westward; for if they carry 7000 men—with what they have at Martinique and Guadeloupe—St. Lucia, Grenada, St. Vincent, Antigua and St. Kitts, would fall—and in that case England would be so clamorous for peace that we should humble ourselves. Whatever may be their destination, I shall certainly follow, be it even to the East Indies." At this time, in effect, Bonaparte had larger projects on hand. Villeneuve, who had been appointed to succeed Latouche-Tréville, was to effect a junction with the Rochefort Squadron, then to proceed to the West Indies, where our colonies were to be seized, and to make an expedition to Surinam, afterwards returning to Europe to relieve the blockade of Ferrol.

Events were now rapidly developing, and the frequent changes in Napoleon's plans reveal unmistakably the influence upon his mind of the incapacity of the French Fleet, and the compressing power exerted by our own. The Spanish treasure ships were seized by Captain Graham Moore on October 5, but it was not until November 22 that Cochrane found his communications with the shore forbidden at Ferrol, nor until January 4, 1805, that Decrès and Gravina signed the secret convention between France and Spain. On December 14 Villeneuve wrote to Napoleon deploring the weakness of his squadron in trained men, and declaring it unfit to go to sea. Meanwhile, on December 12, orders had left Paris which reached him on December 19, instructing him to set sail at the first opportunity, to pick up the Aigle and two frigates at Ferrol, and to cross the Atlantic in order to subjugate our colonies in Demerara and the West Indies, in co-operation with Missiessy, who was expected to join him with the Rochefort Squadron. Troops to the number of 9000 were to be conveyed in the two squadrons under Generals Lauriston and Lagrange. Co-operation was, however, impossible, owing to the weak and demoralized state of the French Fleet, and the impossibility of the different admirals escaping at the right time. Missiessy, in the temporary absence of Sir Thomas Graves, got away from Rochefort on January 11, 1805, and went to the West Indies pursued by Cochrane, but seeing nothing of Villeneuve,

returned without doing anything, and reached the port he had started from.

On receiving his orders, Villeneuve, still dissatisfied with his ships' companies and with the alarming results of the work of fraudulent contractors, issued orders to his captains instructing them as to their conduct in case of a meeting with Nelson. If the squadron had the weather gauge, it was to bear down on the English line, for close action and boarding if necessary, and if it had not the advantage of the wind it was to stand close-hauled in the line of battle awaiting the attack. All was ready for departure on December 30, and Nelson was eager to see the French come out, but the attempt was not made until January 18, and proved disastrous. The wind was blowing hard, the Indomptable lost her masts and several vessels their yards, while there was hardly one of them that did not suffer some damage in her rigging. The material and moral weakness of the French Fleet, upon which I have insisted, was paralysing its action. Villeneuve returned to the port, and wrote to Napoleon that fortune had not abandoned him, since he had not encountered Nelson's squadron, from which he could not have escaped, and which would have inflicted a disaster upon him even if it had been inferior in numbers. He declared that ships such as his, improperly manned, encumbered with troops, losing masts, rigging and sails in the least wind, and occupied in fair weather with repairing the damage done in foul, were useless for any enterprise. Nelson's well-known criticism is not less significant of the underlying causes of the victory of Trafalgar: "These gentlemen are not accustomed to a Gulf of Lyons gale, which we have buffeted for twenty-one months and not carried away a spar."

Villeneuve and the Toulon Squadron.

But Nelson did not learn until February 19 that Villeneuve had put back disabled, though he had had that possibility in mind. He sought the French at Alexandria, and was now every day more persuaded that the original destination was Egypt. To understand what was passing in the mind of the Emperor was impossible. His plans were subjected to kaleidoscopic changes as he received despatches from the ports, realised the impossibility of invading England in the presence of the British Fleet, and turned to the growing danger of Europe. On January 19, 1805, he outlined to Decrès a project for the Brest, Rochefort, and Ferrol Squadrons to undertake an enterprise to India, though Missiessy, from Rochefort, was already on his way to Martinique. On January 27 he wrote to Missiessy a letter, which reached him in the West Indies on March 12, that Villeneuve had orders to proceed to another destination, and that Missiessy was to give up any idea of co-operation with him. After quarrelling with

Villaret-Joyeuse, who was captain-general at Martinique, Missiessy set out homewards, but, if he had remained a few days longer, he might have received later orders of February 27, which reversed those of the previous month.

The changing plans of Bonaparte

This change of purpose was partly due to a plan of co-operation with the Spaniards. On March 2 specific orders were issued which gave command of the whole operation into the hands of Ganteaume, whom Cornwallis, however, held fast in his grip at Brest. The Admiral was to leave the port with his twenty-one ships of the line and six frigates, eluding the blockading squadron, to attack Calder off Ferrol, signal to Gourdon, who was there, to join him with the French and Spanish ships in the port, proceed to Martinique, there to join Villeneuve and Missiessy, and then to return with more than forty ships of the line, appearing off Boulogne, where he would receive further orders. Like instructions were given to Villeneuve, and there were alternative orders in case the junction of forces could not be effected.

Ganteaume had all ready for the great enterprise on March 24, but there were fifteen British ships in the Iroise passage, and he could not get away without fighting. Napoleon's instructions were characteristic, and expressed at once his powerlessness in the naval grasp and his utter want of understanding of naval conditions. "A victory in these circumstances would lead to nothing. Have but one object—to execute your mission. Go out without fighting. *Ce qui doit vous joindre est parti.*" In effect, Villeneuve put to sea from Toulon, when Nelson was to the eastward, on March 30, and arrived at Martinique on May 14, to find that Missiessy had returned and that Ganteaume had not arrived.

Effect of the blockade.

I shall not relate the well-known circumstances of Nelson's doubt as to the course taken by his adversary, the causes that delayed him, or the details of the famous chase to the West Indies. What seems more important is to draw attention to the determining factor in this part of the campaign—the complete inability of Ganteaume to get away from Brest, or to do more than make an ineffectual demonstration on April 15, afterwards returning to the harbour. Two days before this Napoleon had written to General Lauriston that Ganteaume was "hermetically blockaded" at Brest, and hence came the final orders to Villeneuve. Magon was also to proceed to Martinique with two ships from Rochefort carrying orders, and if within thirty-five days of his arrival Ganteaume did not join them, Villeneuve was to return, gather to his flag fifteen French and Spanish ships from Ferrol, and, appearing before Brest with his thirty-five ships, was to join forces with Ganteaume's

twenty-one, and assume command of a grand fleet of fifty-six sail of the line.

Gardner, who was temporarily in command off Brest, took a gloomy view of the situation, expecting Ganteaume to escape, in which case Calder, off Ferrol, would have been in a dangerous case. Ganteaume, however, was forbidden to risk anything, his duty being to await the return of Villeneuve. "What would be the use of a battle?—nothing," wrote Napoleon to Decrès. As is well known, Villeneuve returned, was engaged with Calder in the inconclusive action of July 22, reached Vigo in a distressed and crippled condition, proceeded thence to Ferrol, and put to sea from that place, increased to twenty-nine sail of the line, on August 13, but failed to meet five ships from Rochefort under Allemand, owing to the capture of the Didon, which carried his despatches, by the Phœnix.

Events were now marching to the terrible and inevitable climax. Villeneuve had his order to appear before Brest, passing, it was anticipated, by the Raz de Seine, but Napoleon suspected that he might seek to enter the harbour, and therefore gave, in this matter, supreme authority to Ganteaume, who was to forbid him to do so. Not an hour was to be lost, and the combined fleet was to arrive before Boulogne. "We shall have avenged six centuries of insults and of shame."

But Cornwallis, off Brest, had been reinforced by most of Nelson's squadron and the ships which Calder had brought from Ferrol, and he had thirty-five sail of the line with his flag. Villeneuve had calculated the chances. With his squadron worn out, his ships reeking with disease, and his officers and men demoralised, he saw the hopelessness of his task; and when, on August 15, he discerned the Phœnix, with her prizes, convoyed by the Dragon, 74, and was told they were a detachment of a large English Fleet, he put over his helm and stood southward with all his ships to Cadiz, where he anchored on August 17. "What a fleet! What sacrifices for nothing! What an admiral! All hope destroyed!" The campaign of Trafalgar was at an end, but the battle had yet to be fought, and as long as England lasts shall the great day of October 21, 1805, be honoured and remembered. Of the famous engagement nothing shall be said here. The object has been to set forth the conditions which ruled it and the events that brought it about. While we render homage to the memory of Nelson in this centenary year, let us remember that he did not stand alone. Pre-eminent he remains, but he is a giant amid the giants—those great seamen of a century ago. What if Cornwallis had failed? What if the admirals who were with him had relaxed their grasp? What if

the captains had been less courageous or the young officers less enterprising, or the men demoralised, or the ships unable to keep the sea?

Condition of French Fleet.

On arriving at Vigo, Villeneuve had described his fleet as in a pitiable situation—short of water and victuals, encumbered with sick and wounded, some of the ships partially dismasted and damaged, and deplorably unfit for serious service. The Spaniards were even in a worse plight, and, on arriving at Corunna, Villeneuve said the state of the fleet was frightful. In extenuation of the harsh judgment which has been passed upon the French Admiral, these things must be remembered, and also that he had orders from Napoleon, dated July 16, which authorised him, if the situation of his fleet should have been considerably changed, to proceed in certain conditions to Cadiz. "We have bad masts, bad sails, bad rigging, bad officers, bad seamen." So Villeneuve wrote to Decrès on August 6. If he remained at Corunna many days there would be a famine in the province. French tactics were out of date, he said; the ships could not be formed properly in line; he had not the means, nor the time, nor the possibility of adopting any other tactics with such officers as were under his orders. The Spanish Fleet was in a deplorable state, and Admiral Gravina, who had been praised for the way in which his squadron came out at Cadiz, deserved the severest blame. "I will finish this jeremiad! I write in the bitterness of my soul, but if I give rein to my feelings I shall never end. But why did you not listen to me before I left Toulon?" Such was the inexperience of the officers that there were collisions when the combined fleet left Ferrol. The Sirène was left behind full of sick, and yet over 2000 men were sick in the ships. Again he wrote from Cadiz, on August 22, that he would forgive the world for throwing stones at him, but seamen who took the part of his abusers would be very blind, very contemptible, and, above all, very foolish. On the same day Napoleon wrote to Decrès his opinion of Villeneuve: "I think he has not the character necessary to command a frigate; he is a man without resolution or moral courage. Two Spanish vessels have been in collision; some men have fallen sick in his vessels; there have been contrary winds for two days; a ship of the enemy has been seen; it is rumoured that Nelson has joined Calder—and all his plans are changed, though these things, isolated, are as nothing."

Who can doubt that Napoleon was right? Who can doubt that he was also wrong? From such an admiral, and officers inspired by his despondency, what could he expect? From a fleet which suffered from a deep-seated and long-standing disease, what could be expected?

I think it important to insist on this view of the matter, because, while we celebrate the victory of Trafalgar, we must recognise, if we would regard it in its true proportions and perspective, that it was gained over a fleet that was in every respect inferior. Therein is the great lesson of the Trafalgar campaign—the old lesson of calm preparedness, of means calculated for the ends to be attained, of the moral strength which is based on the consciousness of superiority. And let us find all these things reflected in the fire and self-confidence of Nelson, in the unbroken and undiminished fortitude and endurance of Cornwallis, in the solid strength of admirals like Gardner and Collingwood, in the commanding skill of the captains, in the brilliant courage of the younger officers, and in the sterling qualities of the men of the Fleet which gave us the victory and the assurance of peace in 1805.

JOHN LEYLAND.

PART II.

LIST OF BRITISH AND FOREIGN SHIPS.

PART II.

LIST OF BRITISH AND FOREIGN SHIPS.

The following abbreviations are used throughout the Alphabetical List:—

Class.

- a.c. Armoured cruiser.
- a.g.b. Armoured gunboat.
- b. Barbette ship.
- c.b. Central-battery ship.
- c.d.s. Coast-defence ship.
- comp. (in armour column). Compound or steel-faced armour.
- corv. Corvette.
- cr. Cruiser.
- d.v. Despatch vessel.
- g.b. Gunboat.
- g.v. Gun-vessel.
- H.S. Harveyised or similar hard-faced steel.
- K.S. Krupp steel.
- shd. Sheathed.
- 2 s. Twin screw.
- *t.* Turret-ship (in class column).
- *t.* Trial speed and I.H.P. at trials (in speed and I.H.P. columns).
- to.cr. Torpedo-cruiser.
- to.g.b. Torpedo-gunboat.
- to.r. Torpedo-ram.

Armament.

- l. Light guns under 15 cwt., including boats' guns.
- M. Machine guns.
- f. tu. or b. tu. Fixed or bow tube for discharging fish torpedoes.
- sub. Submerged tube for do.
- A. Armstrong guns.
- K. Krupp guns.

Boilers.

- W.T. Water-tube boilers, where the type is not known or not yet decided.
- B. Belleville.
- Bl. Blechynden.
- B. & W. Babcock and Wilcox.
- D'A. D'Allest.
- D. Dürr.
- E. Earle.
- Ex. Express.
- Du T. Du Temple.
- L. Laird.
- L.N. Laird-Normand.
- M. Mumford.
- Nic. Niclausse.
- Nor. Normand.
- N.S. Normand-Sigaudy.
- R. Reed.
- T. Thornycroft.
- T.S. Thornycroft-Schulz.
- W.F. White-Forster.
- Y[1]. Yarrow small tube.
- Y[2]. Yarrow large tube.
- V.E. Vickers Express.

GREAT BRITAIN.—Armoured Ships.

Class	NAME	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Aboukir shd.	12,375	440	69½	26¼	21,375 B.	Fairfield	Fairfield	1900	1902	783,883	6–2 K.S.	3–1½	..	5 H.N.	6 K.S.	..	2 9·2-in., 12 6-in., 12 12-pr., 3 3-pr., 8 M., 2 l.	2	21·6 t	800 / 1600	755
a.c.	Achilles	13,550	480	73½	27	23,500 Y² & cyl.	Elswick	Hawthorn	Bldg.	..	1,137,781	6–4–3 K.S.	¾–1	6	6	6	6	6 9·2-in., 4 7·5-in., 2 12-pr., 28 3-pr., 2 M.	3	22·33	1000	704
b. 1st cl.	Africa	16,350	425	78	26¾	18,000 B. & W. & cyl.	Chatham	J. Brown	Bldg.	..	1,428,274	9 H.S.	2–1	8·7	12 H.S.	12–6 H.S.	7 K.S.	4 12-in., 4 9·2-in., 10 6-in., 28 small.	4	18·5	950 / 2150	776
b. 1st cl.	Agamemnon	16,500	410	79½	27	16,750 Y²	Govan	Hawthorn Leslie	Bldg.	..	..	12	..	8	..	..	..	4 12-in., 10 9·2-in., 37 small.	..	18	900	865
b. 1st cl.	Albemarle	14,000	405	75½	26½	18,296 B.	Chatham	Thames Ironworks	1901	1903	1,078,307	7–3 K.S.	2–1	..	7 K.S.	11 K.S.	6 K.S.	4 12-in., 12 6-in., 10 12-pr., 6 3-pr., 8 M., 2 l.	4	18·6 t	900 / 2000	750
b. 1st cl.	Albion	12,950	390	74	26	13,500 B.	Blackwall	Mauds'ay	1898	1902	883,805	6–2 H.N.	3–1	..	12–8 H.N.	12–6 H.N.	5 H.N.	4 12-in., 12 6-in., 10 12-pr., 6 3-pr., 8 M., 2 l.	4	18·25 t	1000 / 2300	700
a.c.	Antrim	10,850	450	68½	25	21,000 Y. & cyl.	Clydeb'nk	J. Brown & Co.	1903	..	899,050	6–2 H.N.	2–¾	..	4½ H.N.	6 H.N.	6 H.N.	4 7·5-in., 6 6-in., 2 12-pr., 22 3-pr., 2 M.	2	22·25	800 / 1950	655
a.c.	Argyll	10,850	450	68½	25	21,000 B. & W. & cyl.	Greenock	Greenock Foundry	1904	..	912,588											
b. 2nd c.	Anson	10,600	330	68½	27¼	11,500	Pembroke	Humphrys	1886	1889	780,667	18–8 comp.	3–2½	..	16–6 comp.	14–12 comp.	..	4 13·5-in., 6 6-in., 12 6-pr., 10 3-pr., 7 M., 2 l.		16·75 t	900 / 1200	515
a.c.	Bacchante shd.	12,000	440	69½	26¼	21,520 B.	Clydeb'nk	J. Brown	1902	1902	787,230	6–2 K.S.	3–1½	..	5 H.N.	6 K.S.	..	2 9·2-in., 12 6-in., 12 12-pr., 3 3-pr., 8 M., 2 l.	2	21·75 t	800 / 1600	755
b. 2nd c	Barfleur shd.	10,500	360	70	25½	13,163	Chatham	Greenock Foundry	1892	1894	616,102	12 comp.	2½–2	4 N.S.	8 comp.	9 comp.	4–2 N.S.	4 10-in., 10 6-in., 2 9-pr., 8 6-pr., 9 3-pr., 7 M.	3	18·50	750 / 1240	625
a.c.	Bedford	9800	440	66	24½	22,457 B.	Fairfield	Fairfield	1901	1903	734,330	4–2 K.S.	2–¾	..	3 K.S.	4 K.S.	4 K.S.	14 6-in., 10 12-pr., 3 3-pr., 2 M., 2 l.	2	22·7 t	740 / 1760	687
b. 2nd c.	Benbow	10,600	330	68½	27¼	11,500	Blackwall	Maudslay	1885	1888	830,683	18–8 comp.	3–2½	..	18–6 comp.	14–12 comp.	..	2 16·25-in., 10 6-in., 12 6-pr., 10 3-pr., 7 M., 2 l.		16·75 t	900 / 1200	510
a.c.	Berwick	9800	440	66	24½	22,000 Nic.	W. Beardmore & Co.	Humphrys	1902	1903	776,868	4–2 H.S.	2¾	..	5 N.S.	5–4 N.S.	4 N.S.	14 6-in., 10 12-pr., 3 3-pr., 9 M.G.	2	23·0	800 / 1300	655
a.c.	Black Prince	13,550	480	73½	27	23,500 B. & W. & cyl.	Blackwall	Thames Ironworks	1904	..	1,178,203	6–4–3 K.S.	¾–1	6	6	6	6	6 9·2-in., 10 6-in., 2 12-pr., 28 3-pr., 2 M.	2	22·33	1000 / 2000	704
b. 1st cl.	Britannia	16,350	425	78	26¾	18,000 B & W & cyl	Portsm'th	Humphrys	1904	..	1,420,823	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 12-in., 4 9·2-in., 10 6-in., 28 small.	4	18·5	950 / 2150	776
b. 1st cl	Bulwark	15,000	400	75	26¾	15,000 B.	Devonp't	Hawthorn	1899	1902	1,082,805	9 H.S.	3–2	3 K.S.	12 H.S.	12–5 H.S.	6–2 K.S.	4 12-in., 12 6-in., 16 12-pr., 6 3-pr., 8 M., 2 l.	2	18·0	900 / 2000	750
b. 1st cl.	Cæsar	14,900	390	75	27½	12,000	Portsm'th	Maudslay	1896	1897	935,746	9 H.S.	4–2½	..	14–9 H.S.	14–6 H.S.	6 H.S.	4 12-in., 12 6-in., 16 12-pr., 12 3-pr., 2 M., 2 l.	5	17·5	900 / 2000	757
b. 2nd c.	Camperdown	10,600	330	68½	27¼	11,500	Portsm'th	Maudslay	1885	1889	825,448	18 comp.	3–2½	..	16 comp.	12 comp.	..	4 13·5-in., 6 6-in., 12 6-pr., 10 3-pr., 7 M., 2 l.		16·9 t	900 / 1200	515
b. 1st cl.	Canopus	12,950	390	74	26	13,500 B.	Portsm'th	Greenock Foundry	1897	1900	924,398	6 H.S.	3–1	2 N.S.	12 H.S.	12–5 H.S.	5 H.S.	4 12-in., 12 6-in., 10 12-pr., 6 3-pr., 8 M., 2 l.	5	18·25	800 / 1850	700
a.c.	Carnarvon	10,850	450	68½	25	21,489 Nic. & cyl	Beardm're	Humphrys	1903	..	879,465	6–2 K.S.	2–¾	..	4½ K.S.	6 N.S.	6	4 7·5-in., 6 6-in., 2 12-pr., 22 3-pr., 2 M.	2	23·3 t	800	655
b. 2nd c.	Centurion shd.	10,500	360	70	25½	13,214	Portsm'th	Greenock Foundry	1892	1893	624,402	12 comp.	2½–2	4 N.S.	12 comp.	9 comp.	6–2 K.S.	4 10-in., 10 6-in., 8 6-pr., 12 3-pr., 7 M., 2 l.	3	18·25	750 / 1125	625
a.c.	Cochrane	13,550	480	73½	27	23,500 Y² & cyl.	Fairfield	Fairfield	Bldg.	..	1,146,133	6–4–3 K.S.	¾–1	6	6	6	6	6 9·2-in., 4 7·5-in., 2 12 pr., 28 3-pr., 2 M.	3	22·33	1000	704
t. 3rd c.	Colossus	9420	325	68	26¼	5500	Portsm'th	Maudslay	1882	1886	646,786	18–14 comp.	3–2½	..	16–13 comp.	16 comp.	..	4 12-in., 5 6-in., 4 6-pr., 10 3-pr., 6 M., 4 l.	2	14·2 t	970	388
b. 1st cl.	Commonwealth	16,350	425	78	26¾	18,538 B & W & cyl	Fairfield	Fairfield	1903	1905	1,474,042	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 12-in., 4 9·2-in., 10 6-in., 28 small.	4	19·01 t	950 / 2150	776
a.c.	Cornwall	9800	440	66	24½	22,000 B. & W.	Pembroke	Hawthorn	1902	1905	789,421	4–2 H.S.	2–¾	..	5 N.S.	5–4 N.S.	4 N.S.	14 6-in., 10 12-pr., 3 3-pr., 9 M.	2	23·6 t	800 / 1600	655
b. 1st cl.	Cornwallis	14,000	405	75½	26½	18,238 B.	Blackwall	Thames S. Co.	1899	1904	1,095,171	7 K.S.	2–1	1½	14 K.S.	11–6 K.S.	6 K.S.	4 12-in., 12 6-in., 12 12-pr., 6 3-pr.	4	18·9 t	900 / 2000	750
a.c.	Cressy shd.	12,000	440	69½	26¼	21,240 B.	Fairfield	Fairfield	1899	1901	780,110	6 K.S.	3–2	..	5 K.S.	6 K.S.	..	2 9·2-in., 12 6-in., 12 12-pr., 3 3-pr., 8 M., 2 l.	2	20·79	800 / 1600	755
a.c.	Cumberland	9800	440	66	24½	22,000 B.	Glasgow	London & Glasgow Co.	1903	1904	751,508	4–2 K.S.	2–¾	..	5	5–4	4 N.S	14 6-in., 10 12-pr., 3 3-pr., 9 M.	2	23·0	800 / 1600	655
a.c.	Defence	14,600	490	74½	26	27,000 Y²	Pembroke	Scotts S. & E. Co.	..	..	..	6–4	1–½	3	..	..	..	4 9·2-in., 10 7·5-in., 30 small.	5	23	..	755
a.c.	Devonshire	10,850	450	68½	25	21,000 Nic. & cyl.	Chatham	Thames Ironworks	1904	..	900,792	6–2	2–¾	..	4½ K.S.	6 N.S.	6	4 7·5-in., 6 6-in., 2 12-pr., 22 3-pr., 2 M.	2	22·25	800 / 1600	655

GREAT BRITAIN.—Armoured Ships.

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Aboukir shd.	12,375	440	69½	26¼	21,375 B.	Fairfield	Fairfield	1900	1902	783,883	6–2 K.S.	3–1½	..	5 H.N.	6 K.S.	..	2 9·2-in., 12 6-in., 12 12-pr., 3 3-pr., 8 M., 2 l.	2	21·6 t	800 / 1600	755
a.c.	Achilles	13,550	480	73½	27	23,500 Y² & cyl.	Elswick	Hawthorn	Bldg.	..	1,137,781	6–4–3 K.S.	¾–1	6	6	6	6	6 9·2-in., 4 7·5-in., 2 12-pr., 28 3-pr., 2 M.	3	22·33	1000	704
b. 1st cl.	Africa	16,350	425	78	26¾	18,000 B. & W. & cyl.	Chatham	J. Brown	Bldg.	..	1,428,274	9 H.S.	2–1	8·7	12 H.S.	12–6 H S.	7 K S.	4 12-in., 4 9·2-in., 10 6-in., 28 small.	4	18·5	950 / 2150	776
b. 1st cl.	Agamemnon	16,500	410	79½	27	16,750 Y²	Govan	Hawthorn Leslie	Bldg.	..	..	12	..	8	..	..	..	4 12-in., 10 9·2-in., 37 small.	..	18	900	865
b. 1st cl.	Albemarle	14,000	405	75½	26¼	18,296 B.	Chatham	Thames Ironworks	1901	1903	1,078,307	7–3 K.S.	2–1	..	7 K.S.	11 K.S.	6 K.S.	4 12-in., 12 6-in., 10 12-pr., 6 3-pr., 8 M., 2 l.	4	18·6 t	900 / 2000	750
b. 1st cl.	Albion	12,950	390	74	26	13,500 B.	Blackwall	Maudslay	1898	1902	883,805	6–2 H.N.	3–1	..	12–8 H.N.	12–6 H.N.	5 H.N.	4 12-in., 12 6-in., 10 12-pr., 6 3-pr., 8 M., 2 l.	4	18·25 t	1000 / 2300	700
a.c.	Antrim	10,850	450	68½	25	21,000 Y. & cyl.	Clydeb'nk	J. Brown & Co.	1903	..	899,050	6–2 H.N.	2–¾	..	4½ H.N.	6 H.N.	6 H.N.	4 7·5-in., 6 6-in., 2 12-pr., 22 3-pr., 2 M.	2	22·25	800 / 1950	655
a.c.	Argyll	10,850	450	68½	25	21,000 B. & W. & cyl.	Greenock	Greenock Foundry	1904	..	912,588	6–2 H.N.	2–¾	..	4½ H.N.	6 H.N.	6 H.N.	4 7·5-in., 6 6-in., 2 12-pr., 22 3-pr., 2 M.	2	22·25	800 / 1950	655
b. 2nd c.	Anson	10,600	330	68½	27¼	11,500	Pembroke	Humphrys	1886	1889	780,667	18–8 comp.	3–2½	..	16–6 comp.	14–12 comp.	..	4 13·5-in., 6 6-in., 12 6-pr., 10 3-pr., 7 M., 2 l.		16·75 t	900 / 1200	515
a.c.	Bacchante shd.	12,000	440	69½	26¼	21,520 B.	Clydeb'nk	J. Brown	1902	1902	787,230	6–2 K.S.	3–1½	..	5 H.N.	6 K.S.	..	2 9·2-in., 12 6-in., 12 12-pr., 3 3-pr., 8 M., 2 l.	2	21·75 t	800 / 1600	755
b. 2nd c	Barfleur shd.	10,500	360	70	25½	13,163	Chatham	Greenock Foundry	1892	1894	616,102	12 comp.	2½–2	4 N.S.	8 comp.	9 comp.	4–2 N.S.	4 10-in., 10 6-in., 2 9-pr., 8 6-pr., 9 3-pr., 7 M.	3	18·50	750 / 1240	625
a.c.	Bedford	9800	440	66	24½	22,457 B.	Fairfield	Fairfield	1901	1903	734,330	4–2 K.S.	2–¾	..	3 K.S.	4 K.S.	4 K.S.	14 6-in., 10 12-pr., 3 3-pr., 2 M., 2 l.	2	22·7 t	740 / 1760	687
b. 2nd c.	Benbow	10,600	330	68½	27¼	11,500	Blackwall	Maudslay	1885	1888	830,683	18–8 comp.	3–2½	..	18–6 comp.	14–12 comp.	..	2 16·25-in., 10 6-in., 12 6-pr., 10 3-pr., 7 M., 2 l.		16·75 t	900 / 1200	510
a.c.	Berwick	9800	440	66	24½	22,000 Nic.	W. Beardmore & Co.	Humphrys	1902	1903	776,868	4–2 H.S.	2⅔	..	5 N.S.	5–4 N.S.	4 N.S.	14 6-in., 10 12-pr., 3 3-pr., 9 M.G.	2	23·0	800 / 1300	655
a.c.	Black Prince	13,550	480	73½	27	23,500 B. & W. & cyl.	Blackwall	Thames Ironworks	1904	..	1,178,203	6-4-3 K.S.	¾-1	6	6	6	6	6 9·2-in., 10 6-in., 2 12-pr., 28 3 pr., 2 M.	2	22·33	1000 / 2000	704
b. 1st cl.	Britannia	16,350	425	78	26¾	18,000 B&W&cyl	Portsm'th	Humphrys	1904	..	1,420,823	9 H S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 12-in., 4 9·2-in., 10 6-in., 28 small.	4	18·5	950 / 2150	776
b. 1st cl	Bulwark	15,000	400	75	26¾	15,000 B.	Devonp't	Hawthorn	1899	1902	1,082,805	9 H.S.	3–2	3 K.S.	12 H.S.	12–5 H.S.	6–2 K.S.	4 12-in., 12 6-in., 16 12-pr., 6 3-pr., 8 M., 2 l.	2	18·0	900 / 2000	750
b. 1st cl.	Cæsar	14,900	390	75	27½	12,000	Portsm'th	Maudslay	1896	1897	935,746	9 H.S.	4–2½	..	14–9 H.S.	14–6 H.S.	6 H.S.	4 12-in., 12 6-in., 16 12-pr., 12 3-pr., 2 M., 2 l.	5	17·5	900 / 2000	757
b. 2nd c.	Camperdown	10,600	330	68½	27¼	11,500	Portsm'th	Maudslay	1885	1889	825,448	18 comp.	3–2½	..	16 comp.	12 comp.	..	4 13·5-in., 6 6-in., 12 6-pr., 10 3-pr., 7 M., 2 l.		16·9 t	900 / 1200	515
b. 1st cl.	Canopus	12,950	390	74	26	13,500 B.	Portsm'th	Greenock Foundry	1897	1900	924,398	6 H.S.	3–1	2 N.S.	12 H.S.	12–5 H.S.	5 H.S.	4 12-in., 12 6-in., 10 12-pr., 6 3-pr., 8 M., 2 l.	5	18·25	800 / 1850	700
a.c.	Carnarvon	10,850	450	68½	25	21,489 Nic.&cyl	Beardm're	Humphrys	1903	..	879,465	6–2 K.S.	2–¾	..	4½ K.S.	6 N.S.	6	4 7·5-in., 6 6-in., 2 12-pr., 22 3-pr., 2 M.	2	23·3 t	800	655
b. 2nd c.	Centurion shd.	10,500	360	70	25½	13,214	Portsm'th	Greenock Foundry	1892	1893	624,402	12 comp.	2½–2	4 N.S.	12 comp.	9 comp.	6–2 K.S.	4 10-in., 10 6-in., 8 6-pr., 12 3-pr., 7 M., 2 l.	3	18·25	750 / 1125	625
a.c.	Cochrane	13,550	480	73½	27	23,500 Y² & cyl.	Fairfield	Fairfield	Bldg.	..	1,146,133	6–1–3 K.S.	¾–1	6	6	6	6	6 9·2-in., 4 7·5-in., 2 12 pr., 28 3-pr., 2 M.	3	22·33	1000	704
t. 3rd c.	Colossus	9420	325	68	26½	5500	Portsm'th	Maudslay	1882	1886	646,786	18–14 comp.	3–2½	..	16–13 comp.	16 comp.	..	4 12-in., 5 6-in., 4 6-pr., 10 3-pr., 6 M., 4 l.	2	14·2 t	970	388
b. 1st cl.	Commonwealth	16,350	425	78	26¾	18,538 B&W&cyl	Fairfield	Fairfield	1903	1905	1,474,042	9 H.S.	2–1	8–7	12 H.S.	12–6 H.S.	7 K.S.	4 12-in., 4 9·2-in., 10 6-in., 28 small.	4	19·01 t	950 / 2150	776
a.c.	Cornwall	9800	440	66	24½	22,000 B. & W.	Pembroke	Hawthorn	1902	1905	789,421	4–2 H.S.	2–¾	..	5 N.S.	5–4 N.S.	4 N.S.	14 6-in., 10 12-pr., 3 3-pr., 9 M.	2	23·6 t	800 / 1600	655
b. 1st cl.	Cornwallis	14,000	405	75½	26½	18,238 B.	Blackwall	Thames S. Co.	1899	1904	1,095,171	7 K.S.	2–1	1½	14 K.S.	11–6 K.S.	6 K.S.	4 12-in., 12 6-in., 12 12-pr., 6 3-pr.	4	18·9 t	900 / 2000	750
a.c.	Cressy shd.	12,000	440	69½	26¼	21,240 B.	Fairfield	Fairfield	1899	1901	780,110	6 K.S.	3–2	..	5 K.S.	6 K.S.	..	2 9·2-in., 12 6-in., 12 12-pr., 3 3-pr., 8 M., 2 l.	2	20·79	800 / 1600	755
a.c.	Cumberland	9800	440	66	24½	22,000 B.	Glasgow	London & Glasgow Co.	1903	1904	751,508	4–2 K.S.	2–¾	..	5	5–4	4 N.S	14 6-in., 10 12-pr., 3 3-pr., 9 M.	2	23·0	800 / 1600	655
a.c.	Defence	14,600	490	74½	26	27,000 Y²	Pembroke	Scotts S. & E. Co.	..	..	..	6–4	1–½	3	..	..	..	4 9·2-in., 10 7·5-in., 30 small.	5	23	..	755
a.c.	Devonshire	10,850	450	68½	25	21,000 Nic. & cyl.	Chatham	Thames Ironworks	1904	..	900,792	6–2	2–¾	..	4½ K.S.	6 N.S.	6	4 7·5-in., 6 6-in., 2 12-pr., 22 3-pr., 2 M.	2	22·25	800 / 1600	655

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
t. 3rd c.	Devastation .	9330	285	62¼	27½	7000	Portsm'th	Maudslay	1871	1873	353,848	12–10	3–2	..	12–10	14	..	4 *10-in.*, 6 *6-pr.*, 8 *3-pr.*, 5 M., 2 l.	2	14·0	1800	410
b. 1st cl.	Dominion .	16,350	425	78	26¾	18,438 B. & W. & cyl.	Barrow .	Vickers .	1903	1904	1,450,902	9 K.S.	2–1	8–7 K.S.	12 K.S.	12–6 K.S.	6	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 28 small.	4	19·5 *t*	950 / 2150	776
a.c.	Donegal . .	9800	440	66	24½	22,000 B.	Fairfield .	Fairfield Co.	1902	1903	752,964	4–2 K.S.	2–¾	..	5 K.S.	5–4	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 9 M.	2	23·0	800 / 1600	655
a.c.	Drake . .	14,100	500	71	26	31,450 B.	Pembroke	Humphrys	1901	1902	1,050,675	6 K.S.	3–2	..	5 K.S.	6–5 K.S.	5 K.S.	2 *9·2-in.*, 16 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 2 M.	2	24·11 *t*	1250 / 2500	900
b.	Dreadnought*																					
a.c.	Duke of Edinburgh	13,550	480	73½	27	23,500 B. & W. & cyl.	Pembroke	Hawthorn Leslie	1904	..	1,197,439	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 10 *6-in.*, 2 *12-pr.*, 28 *3-pr.*, 2 M.	2	22·33	1000	704
b. 1st cl.	Duncan . .	14,000	405	75½	26½	18,222 B.	Blackwall	Thames S. Co.	1901	1903	1,090,208	7 K.S.	2–1	1½ K.S.	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 6 *3-pr.*	4	18·9 *t*	900 / 2000	750
b.	Edinburgh .	9,420	325	68	26¼	5,500	Portsm'th	Hum ps	1882	1886	†	18–14 comp.	3–2½	..	16–13 comp.	16 comp.	...	4 *12-in.*, 5 *6-in.*, 4 *6-pr.*, 10 *3-pr.*, 6 M., 2 l.	..	14·2	970	388
h. 1st cl.	Empress of India	14,150	380	75	27½	13,000	Pembroke	Humphrys	1891	1893	902,788	18–5 comp.	3	5	16 comp.	17–6 comp.	6–2 K.N.C.	4 *13·5-in.*, 10 *6-in.*, 16 *6-pr.*, 12 *3-pr.*, 2 M., 2 l.	3	18·0 *t*	900 / 1450	740
a.c.	Essex . .	9,800	440	66	24½	22,000 B.	Pembroke	JohnBrown	1901	1903	770,325	4–2 K.S.	2–¾	..	5	5	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	..	23·0	800 / 1600	655
a.c.	Euryalus . shd.	12,000	440	69½	26¼	21,318 B.	Barrow .	Vickers .	1901	1904	817,880	6 K.S.	3–2	2	5 K.S.	6 K.S.	..	2 *9·2-in.*, 12 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 8 M.	2	21·63 *t*	800 / 1600	755
b. 1st cl.	Exmouth .	14,000	405	75½	26½	18,346 B.	Laird .	Laird .	1901	1903	1,099,674	7 K.S	2–1	1½ K.S.	14 K.S.	11–6 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 6 *3-pr.*	4	19·0	900 / 2000	750
b. 1st cl.	Formidable .	15,000	400	75	26¾	15,000 B.	Portsm'th	Earle .	1898	1901	1,079,432	9 H.S.	3–2	2	12 H.S.	12–5	8 K.S.	4 *12-in.*, 12 *6-in.*, 16 *12-pr.*, 6 *3-pr.*, 8 M., 2 l.	..	18·0	900 / 2000	750
b. 1st cl.	Glory . .	12,950	390	74	26	13,500 B.	Laird .	Laird .	1899	1901	888,649	6 H.S.	3–2	2 N.S.	12 H.S.	12–5 H.S.	5 H.S.	4 *12-in.*, 12 *6-in.*, 10 *12-pr.*, 6 *3-pr.*, 8 M., 2 l.	5	18·25	800 / 1850	700
b. 1st cl.	Goliath . .	12,950	390	74	26	13,500 B.	Chatham .	Penn .	1898	1900	915,588											
a.c.	Good Hope .	14,100	500	71	26	31,071 B.	Fairfield .	Fairfield .	1901	1902	1,023,629	6 K.S.	3–2	..	5 K.S.	6–5 K.S.	5 K.S.	2 *9·2-in.*, 16 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 2 M.	2	23·5 *t*	1250 / 2500	900
a.c.	Hampshire .	10,850	450	68½	25	21,000 Y. & cyl.	Elswick .	Hawthorn.	1903	..	872,327	6–2 K.S.	2–¾	..	5 K.S.	5–4 N.S.	..	4 *7·5-in.*, 6 *6-in.*, 2 *12-pr.*, 22 *3-pr.*, 2 M.	2	22·25	800 / 1600	655
b. 1st cl.	Hannibal .	14,900	390	75	27½	12,000	Pembroke	Harland .	1895	1897	958,877	9 H.S.	4–2½	..	14–9 H.S.	14–6 H.S.	6 H.S.	4 *12-in.*, 12 *6-in.*, 16 *12-pr.*, 12 *3-pr.*, 2 M., 2 l.	5	17·5	900 / 2200	757
b. 1st cl.	Hibernia .	16,350	425	78	26¾	18,000 B.&W. & cyl.	Devonp'rt	Harland & Wolff	Bldg.	..	1,423,055	9 H.S.	2–1	8	12 H.S.	12–6 H.S.	7 K.S.	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 28 small	4	18·5	950 / 2150	776
b. 1st cl.	Hindustan					18,521 B.&W. & cyl.	Clydeb'nk	J. Brown & Co.	1903	1905	1,450,148	9 K.S.	2–1	8	12 K.S.	12 N.S.	6 N.S.			19·01 *t*		
a.c.	Hogue . sh.d.	12,000	440	69½	26¼	21,432 B.	Barrow .	Vickers .	1900	1902	787,507	6 K.S.	3	2 H.S.	5 K.S.	6 K.S.	..	2 *9·2-in.*, 12 *6-in.*, 12 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	2	22·6 *t*	800 / 1600	755
t. 1st cl.	Hood . .	14,150	380	75	27½	13,000	Chatham	Humphrys	1891	1893	914,836	18 comp.	3	5 comp.	17 comp.	18–6 comp.	6–2	4 *13·5-in.*, 10 *6-in.*, 10 *6-pr.*, 12 *3-pr.*, 2 M., 2 l.	3	17·5	900 / 1800	730
h. 1st cl.	Howe . .	10,300	325	68	27¼	11,500	Pembroke	Humphrys	1885	1889	766,597	18 comp.	3–2½	..	16 comp.	11½ comp.	..	4 *13·5-in.*, 6 *6-in.*, 12 *6-pr.*, 10 *3-pr.*, 7 M., 2 l.	..	16·8	900 / 1200	515
h. 1st cl.	Illustrious .	14,900	390	75	27½	12,000	Chatham	Penn .	1896	1898	950,804	9 H.S.	4–2½	..	14–9 H.S.	14–6 H.S.	6 H.S.	4 *12-in.*, 12 *6-in.*, 18 *12-pr.*, 12 *3-pr.*, 2 M., 2 l.	5	17·5	900 / 2200	757
b. 1st cl.	Implacable	15,000	400	75	26¾	15,000 B.	D'port	Laird	1899	1902	1,075,277	9 K.S.	3–2	2	12 K.S.	12–5 K.S.	6	4 *12-in.*, 12 *6-in.*, 16 *12-pr.*, 6 *3-pr.*, 8 M., 2 l.	2	18·0	900 / 2000	755
	Irresistible						Chatham	Maudslay	1898		1,081,391											
a.c.	Invincible and 3 others*																					
	London . .	15,000	400	75	26½	15,000 B.	Portsm'h	Earle	1899	1902	1,114,808	9 K.S.	3–2	2	12 K.S.	12–5 K.S.	6	4 *12-in.*, 12 *6-in.*, 16 *12-pr.*, 6 *3-pr.*, 8 M., 2 l.	2	18·0	900 / 2000	755

* Programme 1905–06, particulars of design unsettled. † Details of cost incomplete.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
b. 1st cl.	Lord Nelson	16,500	410	79½	27	16,750 B. & W.	Jarrow	Palmer	Bldg.	..	*	12		8	..	..	..	4 *12-in.*, 10 *9·2-in.*, 37 small		18	900	865
a.c.	Kent	9800	440	66	24½	21,000 B.	Portsm'th	Hawthorn	1900	1903	733,940	4–2 K.S.	2–¾	..	5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	..	24 *t*	800 / 1600	500
a.c.	King Alfred	14,100	500	71	26	30,893	Barrow	Vickers	1901	1903	1,013,772	6-5-4 K.S.	2½–1	..	5 K.S.	6–5 K.S.	5 K.S.	2 *9·2-in.*, 16 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 2 l.	2	23·46	1250 / 2500	813
	Leviathan					31,203 B.	Clydeb'nk	J. Brown			1,043,917									23·28 *t*		
b. 1st cl.	King Edward VII.	16,350	425	78	26¾	18,138 B. & W. & cyl.	Devonp'rt	Harland	1903	1905	1,499,971	9 K.S.	2–1	8–7 K.S.	12 K.S.	12–6 N.S.	6	4 *12-in.*, 4 *9·2-in.*, 10 *6-in.*, 28 small	4	19·04 *t*	950 / 1200	776
a.c.	Lancaster	9800	410	66	24½	22,000 B.	Elswick	Hawthorn	1903	1904	763,084	4–2 K.S.	2–¾		5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 9 M.	2	23·0	800 / 1600	500
b. 1st cl.	Jupiter	14,900	390	75	27½	12,000	Clydeb'nk	Thomson	1895	1897	966,856											
b 1st cl.	Magnificent	14,900	390	75	27½	12,000	Chatham	Penn	1894	1895	982,391											
b. 1st cl.	Majestic	14,900	390	75	27½	12,000	Portsm'th	Barrow	1895	1895	983,732	9 H.S.	4–2½	..	14–9 H.S.	14–6 H.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 16 *12-pr.*, 12 *3-pr.*, 2 M., 2 l.	5	17·5	900 / 2200	757
b 1st cl.	Mars	14,900	390	75	27½	12,000	Birkenh'd	Laird	1896	1897	964,581											
a.c.	Minotaur	14,600	490	74½	26	27,000 Y^2	Devonp'rt	Harland & Wolff	Bldg	..	*	6–4	..	..	..	..	..	4 *9·2-in.*, 10 *7·5-in.*, 30 small.	5	23	1000	755
a.c.	Monmouth	9800	440	66	24½	22,000 B.	Glasgow	London & Glasgow Shipbg. Co	1901	1903	709,085	4–2 K.S.	2–¾	4 K.S.	5 K.S.	5–4 N.S.	4 K.S.	14 *6-in.*, 10 *12-pr.*, 3 *3-pr.*, 8 M., 2 l.	..	23·0	800 / 1600	500
b. 1st cl.	Montagu	14,000	405	75½	26½	18,285 B.	Devonport	Laird	1901	1903	1,046,992	7 K.S.	2–1	1½	14 K.S.	11·6 N.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 12 *12-pr.*, 6 *3-pr.*, 2 M., 2 l.	4	18·8	900 / 2000	750
a.c.	Natal	13,550	480	73½	27	23,500 Y^2 & Cyl.	Barrow	Vickers	Bldg.	..	1,162,366	6–4–3 K.S.	¾–1	6	6	6	6	6 *9·2-in.*, 4 *7·5-in.*, 2 *12-pr.*, 28 *3-pr.*, 2 M.	3	22·33	1000	704
b. 1st cl.	New Zealand	16,350	425	78	26¾	18,000 B. & W. & Cyl.	Portsm'th	Humphrys	1904	1905	1,491,955	9 K.S.	2–1	8–7 K.S.	12 K.S.	12 K.S.	6	4 *12-in.*, 4 *9·2*-in., 10 *6-in.*, 28 small	4	18·5	950 / 2150	776
t. 1st cl.	Nile †	11,940	345	73	27½	12,000	Pembroke	Maudslay	1888	1890	890,283	20–16 *comp.*	3	3	18–14 *comp.*	18 *comp.*	..	4 *13·5-in.*, 6 *6-in.*, 8 *6-pr.*, 12 *3-pr.*, 7 M., 3 l.	4 (2 sub.)	16·7 *t*	900 / 1200	558
b. 1st cl.	Ocean	12,950	390	74	25½	13,500 B.	Devonport	Hawthorn	1898	1900	936,048	6 H.S.	2–1	..	12 H.S.	12–5 H.S.	5 H.S.	4 *12-in.*, 12 *6-in.*, 10 *12-pr.*, 6 *3-pr.*, 8 M., 2 l.	5 (4 sub.)	18·25	800 / 1850	700
b. 1st cl.	Prince George	14,900	390	75	27½	12,000	Portsm'th	Humphrys	1895	1896	971,444	9 H.S.	4–2½	..	14–9 H.S.	14–6 H.S.	6	4 *12-in.*, 12 *6-in.*, 16 *12-pr.*, 12 *3-pr.*, 2 l.	5 (4 sub.)	17·5	900 / 2200	757
b. 1st cl.	Prince of Wales	15,000	400	75	26¾	15,000 B.	Chatham	Greenock Foundry	1902	1904	1,224,804	9 K.S.	2–1	3	12 K.S.	12–6 N.S.	6–2 K.S.	4 *12-in.*, 12 *6-in.*, 16 *12-pr.*, 6 *3-pr.*, 8 M., 2 l.	4	18	900	755
b. 1st cl.	Queen	15,000	400	75	26¾	15,000 B. & W.	Devonport	Harland & Wolff	1902	1904	1,206,980											
b. 1st cl.	Renown shd	12,350	380	72	26¾	12,000	Pembroke	Maudslay	1895	1896	746,247	8–6 H.	3–2	..	10–6 H.S.	10 H.S.	6–2	4 *1 -in.*, 10 *6-in.*, 12 *12-pr.*, *-pr.*, 2 M., 2 l.	5 (2 sub.)	18·0	900 / 1450	674
b. 1st cl.	Ramillies	14,150	380	75	27½	13,000	Glasgow	Thomson	1892	1893	952,550											
b 1st cl.	Repulse	14,150	380	75	27½	13,000	Pembroke	Humphrys	1892	1894	907,848	18–5 *comp.*	3	5–4 N.S.	16 *comp.*	17 *comp.*	6–2 K.N.C	4 *13·5-in.*, 10 *6-in.*, 16 *6-pr.*, 12 *3-pr.*, 2 M., 2 l.	3 (2 sub.)	17·5	900 / 1450	730
b. 1st cl.	Resolution	14,150	380	75	27½	13,000	Jarrow	Palmer	1892	1893	929,267											

* Details of cost incomplete.

† The b w and stern torpedo ports in Trafalgar and Nile remain, but tubes have been removed in these vessels and in all the "Admiral" class.

GREAT BRITAIN.—Armoured Ships—*continued.*

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.	in.	in.	in.	in.			knots.	tons.	
1st cl.	Revenge .	14,150	380	75	27½	13,000	Jarrow .	Palmer .	1892	1895	927,386											
b. 1st cl.	Royal Oak .	14,150	380	75	27½	13,000	Birkenh'd	Laird .	1892	1894	1,014,943	18–5 comp.	3	5–4 N.S.	16 comp.	17 comp.	6–2 K.N.C.	4 . 5-in., 10 6-in., 16 6-pr., 12 3-pr., 2 M., 2 l.	3 (2 sub.)	17·5	900/1800	730
b. 1st cl.	Royal Sovereign	14,150	380	75	27½	13,312	Portsm'th	Humphrys	1891	1892	824,583											
b. 1st cl.	Rodney .	10,300	325	68	27¼	11,500	Chatham	Humphrys	1884	1888	824,652	18 comp.	3–2½	..	16 comp.	11 comp.	..	4 13·5-in., 6 6-in., 12 6-pr., 10 3-pr., 6 M., 2 l.		16·75	900/1200	515
a.c.	Roxburgh.	10,850	450	68½	25	21,000 D. & cyl.	London & Glasgow	London & Glasgow Company	1904	..	863,199	6–2 K.S.	2–¾	..	4½ K.S.	6 N.S.	6	4 7·5-in., 6 6-in., 2 12-pr., 22 3-pr., 2 M.	2	22·25	800/1600	655
b. 1st cl.	Russell .	14,000	405	75½	26½	18,229 B.	Jarrow .	Palmer .	1901	1903	1,098,717	7 K.S.	2–1	1½ K.S.	14 K.S.	11–6 K.S.	6 K.S.	4 12-in., 12 6-in., 12 12-pr., 6 3-pr.	4	19·3 t	900/2000	750
a.c.	Shannon .	14,600	490	75½	25	27,000 Y²	Chatham	Humphrys	Bldg.	..	†	6–4	1–½	3	..	..	..	4 9·2-in., 10 7·5-in., 30 small.	..	23	950	755
a.c.	Suffolk .	9800	440	66	24½	22,000 Nic.	Portsm'th	Humphrys	1903	1904	783,054	4–2 K.S.	2–¾	..	5 K.S.	5–4 N.S.	4 K.S.	14 6-in., 10 12-pr., 3 3-pr., 9 M.	2	24·7 t	800/1600	500
a.c.	Sutlej . shd.	12,000	440	69½	26¼	21,261 B.	Clydeb'nk	Clydebank Company	1899	1902	790,706	6 K.S.	3–2	..	5 K.S.	6 K.S.	..	2 9·2-in., 12 6-in., 12 12-pr., 3 3-pr., 8 M., 2 l.	2	21·77 t	800/1600	755
b. 1st cl.	Swiftsure .	11,800	436	71	24½	12,500	Elswick .	Humphrys, Tennant	1903	1904	959,474	7	3	7	..	10	7 K.S.	4 10-in., 14 7·5-in., 24 small.	2	19·6 t	800/2000	700
b. 1st cl.	Triumph .						Barrow .	Vickers .	1903		958,670											
t. 2nd c.	Thunderer .	9330	285	62½	27	7000	Pembroke	Maudslay	1872	1877	873,038	12–10	3–2	..	12–10	14–12	..	4 10-in., 6 6-pr., 8 3-pr., 4 M., 2 l.	2	14·0	1600	592
t. 1st cl.	Trafalgar *	11,940	345	73	27½	12,000	Portsm'th	Humphrys	1887	1890	862,794	20–16 comp.	3	3	18–14 comp.	18 comp.	..	4 13·5-in., 6 6-in., 8 6-pr., 12 3-pr., 6 M., 3 l.	4 (2 sub.)	16·7 t	900/1200	572
b. 1st cl.	Victorious	14,900	390	75	27½	12,000	Chatham	Hawthorn	1895	1897	961,783	9 H.S.	3–2½	..	14–9 H.S.	14–6 H.S.	6	4 12-in., 12 6-in., 18 12-pr., 12 3-pr., 8 M., 2 l.	5 (4 sub.)	17·5	900/2200	757
b. 1st cl.	Venerable.	15,000	400	75	26¾	15,345 B.	Chatham	Maudslay	1899	1902	1,153,974	7 K.S.	4–2½	3	14 K.S.	11–6 K.S.	6–2	4 12-in., 12 6-in., 16 12-pr., 6 3-pr., 8 M., 2 l.	2	18·3 t	900/2000	755
b. 1st cl.	Vengeance	12,950	390	74	26	13,500 B.	Barrow .	Vickers .	1899	1901	880,872	6 H.N.S.	2–1	..	12 H.N.S.	12–6 H.S.	5 H.S.	4 12-in., 12 6-in., 12 12-pr., 6 3-pr., 8 M.	4	18·5	800/1850	750
a.c.	Warrior .	13,550	480	73½	27	23,500 Y² & cyl.	Pembroke	Wallsend, Slipway, etc., Co.	Bldg.	..	1,183,946	6–4–3 K.S.	¾–1	6	6	6	6	6 9·2-in., 4 7·5 in., 2 12-pr., 28 3-pr., 2 M.	3	22·33	1000	704

* The bow and stern torpedo ports in Trafalgar and Nile remain, but tubes have been removed in these vessels and in all "Admiral" class.

† Details of cost incomplete.

The battleships **Collingwood, Conqueror, Hero,** and **Sans Pareil,** and the armoured cruisers **Aurora, Immortalité, Narcissus** and **Undaunted,** have been struck off the effective list, but their armaments have not been removed.

GREAT BRITAIN.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
Scout	Adventure	2940	374	38¼	13½	16,000 Y mod.	Elswick	Hawthorn.	1904	..	274,961	2	¾	10 *12-pr.*, 8 *3-pr.*	2	25	150	268
3rd cl. Cr.	Æolus . shd.	3600	300	43	17½	9000	Devonp'rt	Hawthorn.	1892	1893	218,246	2-1	2	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	19·75	400 / 535	273
3rd cl. Cr.	Amethyst	3000	360	40	14½	14,200 Y mod.	Elswick	Parsons' Turbine	1903	1904	238,924	..	..	12 *4-in.*, 8 *3-pr.*	..	23·42	300	296
1st cl. Cr.	Amphitrite shd.	11,000	435	69	25¼	18,000 B.	Barrow	Vickers	1898	1900	575,300	4	3–6 H. S.	16 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 2 M.	2 (1 sub.)	20·75	1000	677
1st cl. Cr.	Andromeda shd.	11,000	435	69	25¼	16,500 B.	Pembroke	Hawthorn.	1897	1900	601,356	3–6	3	16 *6-in.*, 14 *12-pr.*, 4 *3-pr.*, 2 M.	2	20·5	1000	600
1st cl. Cr.	Argonaut . shd.	11,000	435	69	25¼	18,000 B.	Fairfield	Fairfield	1898	1900	573,704	4	3–6 H. S.	16 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 2 M.	2 (1 sub.)	20·75	1000	677
,, ,,	Ariadne . shd.	11,000	435	69	25¼	18,000 B.	Clydeb'nk	John Brown	1898	1900	565,464							
2nd cl. Cr.	Arrogant	5750	320	57½	21	10,000 B.	Devonp'rt	Earle	1896	1898	278,878	1–2 N.S.	3 N.S.	10 *6-in.*, 8 *12-pr.*, 3 *3-pr.*, 1 l., 5 M.	2	19·6	500	480
3rd cl. Cr.	Astræa . shd.	4360	320	49½	19	9112	Devonp'rt	Devonport	1893	1894	265,745	2–1	2	2 *6-in.*, 8 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	19·75	400	312
Scout	Attentive	2940	374	38¼	13½	16,000 Y.	Elswick	Hawthorn	Bldg.	..	275,652	2	¾	10 *12-pr.*, 8 *3-pr.*	2	25	150	268
3rd cl. Cr.	Barham	1830	280	35	13¼	4700 T.	Portsm'th	Hawthorn	1889	1890	120,107	2–1	2	6 *4·7-in.*, 4 *3-pr.*, 2 M.	2	18·6	140	169
,, ,,	Bellona	1830	280	35	13¼	4700 T.	Newcastle	Hawthorn	1890	1891	99,274	2–1	2	6 *4·7-in.*, 4 *3-pr.*, 2 M.	2	17·8	140	169
2nd cl. Cr.	Blake	9000	375	65	25¾	20,000	Chatham.	Maudslay	1889	1892	464,483	6–3	6	2 *9·2-in.*, 10 *6-in.*, 16 *3-pr.*, 7 M., 2 l.	4	21·5	1500	570
1st cl. Cr.	Blenheim	9000	375	65	25¾	21,411	Blackwall	Humphrys	1890	1893	453,930							
3rd cl. Cr.	Bonaventure shd.	4360	320	49½	19	9000	Devonp'rt	Hawthorn.	1892	1894	258,974	2–1	2	2 *6-in.*, 8 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	19·5	400	312
3rd cl. Cr.	Brilliant . shd.	3600	300	43¾	17½	9164	Sheerness	Hawthorn.	1891	1893	219,852	2–1	2	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	19·7	400	273
3rd cl. Cr.	Cambrian. shd.	4360	320	49½	19	9000	Pembroke	Hawthorn.	1893	1894	248,883	2–1	2	2 *6-in.*, 8 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	19·5	400	312
2nd cl. Cr.	Challenger	5880	355	56	21½	12,500 B.&W.	Chatham	Wallsend Eng'ng Co.	1902	1904	411,530	..	..	11 *6-in.*, 9 *12-pr.*, 6 *3-pr.*, 2 M.	..	20·75 to 21·0	500	..
3rd cl. Cr.	Charybdis shd.	4360	320	49½	19	9000	Sheerness	Earle	1893	1895	253,135	2–1	2	2 *6-in.*, 8 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	19·5	400	312
T. G. B.	Circe *	810	230	27	8¾	5800 F.	Sheerness	Penn	1892	1893	64,122	..	2	2 *4·7-in.*, 4 *3-pr.*	3	21·6	100	91
1st cl. Cr.	Crescent . shd.	7700	360	60	23¾	12,000	Portsm'th	Penn	1892	1894	411,108	5–1	6	1 *9·2-in.*, 12 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 6 M., 2 l.	2 (1 sub.)	19·7	850	560
1st cl. Cr.	Diadem . shd.	11,000	435	69	26	16,500 B.	Fairfield	Fairfield	1896	1899	582,662	4–2½	4½–2	16 *6-in.*, 14 *12-pr.*, 4 *3-pr.*, 2 M.	2 (1 sub.)	20·5	1000	357
3rd cl. Cr.	Diamond	3000	360	40	14½	10,056 N. L.	Birkenh'd	Laird	1904	1905	242,061	..	..	12 *4-in.*, 8 *3-pr.*	..	22·17 *t*	300	296
2nd cl. Cr.	Diana . shd.	5600	350	54	21	9600	Fairfield	Fairfield	1895	1898	269,639							
,, ,,	Dido . shd.	5600	350	54	21	9600	Glasgow.	London and Glasgow Co.	1896	1898	268,188	2½	3	11 *6-in.*, 9 *12-pr.*, 7 *3-pr.*, 5 M., 1 l.	3 (2 sub.)	19·5	550	470
,, ,,	Doris . shd.	5600	350	54	21	9600	Barrow	Barrow	1896	1898	270,823							

* Re-engined and reboilered with Thornycroft small-tube water-tube boilers at Fairfield.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
T. G. B.	Dryad	1070	250	30½	9	3500	Chatham	Maudslay	1893	1894	75,921	..	2	2 *4·7-in.*, 4 *6-pr.*	3	19·0	100	120
2nd cl. Cr.	Eclipse . shd.	5600	350	53	20¼	9600	Portsm'th	Portsm'th	1894	1897	292,745	1½–3	3	11 *6-in.*, 8 *12-pr.*, 6 *3-pr.*, 5 M., 1 l.	3	19·5	550	477
,, ,,	Edgar	7350	360	60	23¾	12,000	Devonp'rt	Fairfield	1890	1893	428,081	5–1	6	2 *9·2-in.*, 10 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 7 M., 2 l.	4	20·5	850	544
,, ,,	Encounter	5880	355	56	21¼	12,500 Durr	Devonp'rt	Devonport Dockyard	1903	..	429,577	..	..	11 *6-in.*, 9 *12-pr.*, 6 *3-pr.*, 2 M.	..	20·75 to 21·0	600	..
,, ,,	Endymion	7350	360	60	23¾	12,000	Hull	Earle	1891	1894	397,973	5–1	6	2 *9·2-in.*, 10 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 6 M., 2 l.	2	20·5	850	544
1st cl. Cr.	Europa . shd.	11,000	435	69	26	16,500 B.	Clydeb'nk	Thomson	1897	1899	589,835	4–2½	4½–2	16 *6-in.*, 14 *12-pr.*, 4 *3-pr.*, 2 M.	2	20·5	1000	357
3rd cl. Cr.	Flora . shd.	4360	320	49½	19	9000	Pembroke	Barrow	1893	1895	253,783							
,, ,,	Forte. . shd.	4360	320	49½	19	9000	Chatham	Chatham	1893	1895	252,780	2–1	2	2 *6-in.*, 8 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	19·5	400	312
,, ,,	Fox . shd.	4360	320	49½	19	9000	Portsm'th	Portsm'th	1893	1895	256,042							
,, ,,	Forth	4050	300	46	20	5700	Pembroke	Hawthorn	1886	1889	289,224	3–2	2	2 *8-in.*, 10 *6-in.*, 3 *6-pr.*, 8 *3-pr.*, 6 M., 2 l.	2	16·8	900	326
Scout.	Foresight	2945	360	39	14	16,500 F.	Fairfield	Fairfield	1904	..	289,224	1½–⅝	..	10 *12-pr.*, 8 *3-pr.*	2	25·0	150	268
,,	Forward								..	..	288,735						380	
2nd cl. Cr.	Furious . shd.	5750	320	57½	21	10,000 B.	Devonp'rt	Earle	1896	1899	288,830	1–2	3	10 *6-in.*, 8 *12-pr.*, 3 *3-pr.*, 5 M., 1 l.	2	19·0	500	480
,, ,,	Gladiator . shd.					10,000 B.	Portsm'th	Maudslay	1896	1900	300,612							
,, ,,	Gibraltar . shd.	7700	360	60	23¾	12,000	Glasgow	Napier	1892	1894	377,741	5–1	6	2 *9·2-in.*, 10 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 6 M., 2 l.	2	19·7	850	544
,, ,,	Grafton	7350	360	60	23¾	12,000	Blackwall	Humphrys	1892	1894	381,958	..	6	2 *9·2-in.*, 10 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 6 M., 2 l.	2	20·0	850	560
T. G. B.	Halcyon	1070	250	30½	9	6000 L.W.R	Devonp'rt	Cammell Laird	1894	1895	77,521	..	2	2 *4·7-in.*, 4 *6-pr.*	3	19·0	100	120
,,	Harrier	1070	250	30½	9	3500	Devonp'rt	Hawthorn	1894	1895	75,858	..						
2nd cl. Cr.	Hawke	7350	360	60	23¾	12,000	Chatham	Fairfield	1891	1893	413,101	5–1	6	2 *9·2-in.*, 10 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 6 M., 2 l.	2	20·0	850	544
T. G. B.	Hazard	1070	250	30½	9	3500	Pembroke	Fairfield	1894	1894	76,506	..	2	2 *4·7-in.*, 4 *6-pr.*	3	19·0	100	120
2nd cl. Cr.	Hermes . shd.	5600	350	54	20½	10,000 B. &W.	Fairfield	Fairfield	1898	1900 1902	300,593							
,, ,,	Highflyer shd.	5600	350	54	20½	10,000 B.	Fairfield	Fairfield	1898	1900	298,863	1½–3	3	11 *6-in.*, 9 *12-pr.*, 6 *3-pr.*, 2 M.	2	20·0	600	477
,, ,,	Hyacinth . shd.	5600	350	54	20½	10,000 B.	Glasgow	London and Glasgow Co.	1898	1901	304,139							
3rd cl. Cr.	Hermione shd.	4360	320	49½	19	9000	Devonp'rt	Thomson	1893	1895	235,231	2–1	2	2 *6-in.*, 8 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	19·5	400	312
T. G. B.	Hussar	1070	250	30½	9	3500	Devonp'rt	Hawthorn	1894	1895	75,316	..	2	2 *4·7-in.*, 4 *6-pr.*	3	19·0	100	120
3rd cl. Cr.	Indefatigable shd.	3600	300	43¾	17½	9000	Glasgow	London and Glasgow Co.	1891	1892	190,309	2–1	2	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 1 M., 1 l.	4	19·75	400	273
,, ,,	Iphigenia . shd.	3600	300	43¾	17½	9000	Glasgow	London and Glasgow Co.	1891	1893	190,965							

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Makers of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
3rd cl. Cr.	Isis . shd.	5600	350	54	21	9600	Glasgow	London and Glasgow Co.	1896	1898	268,725	2½	3	11 *6-in.*, 9 *12-pr.*, 7 *3-pr.*, 5 M., 1 l.	4 (2 sub.)	20·0	550	470
" "	Juno . shd.	5600	350	54	21	9600	Barrow	Barrow	1895	1898	270,993							
T. G. B.	Jason*	810	230	27	8¾	5800 R.	Barrow	Barrow	1892	1893 1902	51,369	..	2	2 *4·7-in.*, 4 *3-pr.*	3	21·9 *t*	100	91
3rd cl. Cr.	Latona	3400	300	43	16½	9000	Barrow	Barrow	1890	1892	180,353	2	2–1	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	20·0	400	273
T. G. B.	Leda*	810	230	27	8¾	5800 T.	Sheerness	Penn	1892	1894	64,332	2	..	2 *4·7-in.*, 4 *3-pr.*	3	21·8	100	91
2nd cl. Cr.	Minerva . shd.	5600	350	53	20½	9600	Chatham	Chatham	1895	1897	291,037	1½–3	3	11 *6-in.*, 9 *12-pr.*, 6 *3-pr.*, 5 M.	3 (2 sub.)	20·3	550	437
1st cl. Cr.	Niobe . shd.	11,000	435	69	26	16,500 B.	Barrow	Vickers	1897	1899	574,878	4–2½	4½–2	16 *6-in.*, 14 *12-pr.*, 4 *3-pr.*, 2 M.	2 (2 sub.)	20·5	1000	600
T. G. B.	Niger	810	230	27	8¾	6282 R.	Barrow	Barrow	1892	1894 1902	50,364	..	2	2 *4·7-in.*, 4 *3-pr.*	3	20·5 *t*	100	91
Scout	Pathfinder	3000	370	38¾	14	16,500 L.N.	Birkenh'd	Laird	1904	1905	278,803	½–⅝	..	10 *12-pr.*, 8 *3-pr.*	2	25	150/380	268
"	Patrol									..	279,176							
3rd cl. Cr.	Pandora	2200	305	36¾	13½	7000 T.	Portsm'th	Portsm'th	1900	1901	173,216							
" "	Pegasus	2135	300	36½	17	7000 R.	Jarrow	Palmer	1897	1899	141,252							
" "	Pelorus	2135	300	36½	17	7000 Nor.	Sheerness	Thomson	1896	1897	164,840							
" "	Perseus	2135	300	36½	13½	7000 T.	Hull	Earle	1898	1901	138,264							
" "	Pioneer	2200	305	36¾	13½	7000 T.	Chatham	Fairfield	1899	1900	154,480	2	·22	8 *4-in.*, 8 *3-pr.*, 2 l.	2	20·0	250/517	224
" "	Prometheus	2135	300	36½	13½	7000 T.	Hull	Earle	1898	1901	135,916							
" "	Psyche	2200	305	36¾	17½	7000 T.	Devonp'rt	Devonport	1898	1900	160,963							
" "	Proserpine	2135	300	36½	17	7000 T.	Sheerness	Devonport	1896	1899	170,780							
" "	Pyramus	2135	300	36½	13½	7000 R.	Jarrow	Palmer	1898	1900	141,008							
1st cl. Cr.	Powerful . shd.	14,200	500	71	29	25,000 B.	Barrow	Barrow	1895	1898	741,870	3–6	6	2 *9·2-in.*, 16 *6-in.*, 14 *12-pr.*, 8 *3-pr.*, 9 M., 2 *12-pr.* boat.	4	22·1	1500/3000	840
2nd cl. Cr.	Royal Arthur shd.	7700	360	60	27¾	12,000	Portsm'th	Maudslay	1891	1893	427,620	5–1	6	1 *9·2-in.*, 12 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 6 M., 2 l.	2 (2 sub.)	19·7	850	567
1st cl. Cr.	St. George. shd.	7700	360	60¾	23¾	12,000	Hull	Maudslay	1892	1894	407,540	5–1	6	2 *9·2-in.*, 10 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 6 M., 2 l.	2 (2 sub.)	19·7	850	559
3rd cl. Cr.	Sapphire	3000	360	40	14½	10,200	Palmer	Palmer	1904	1905	234,187	..	..	12 *4-in.*, 8 *3-pr.*	..	22·45 *t*	300	296
" "	Sappho	3400	300	43	16½	9861	Poplar	Penn	1891	1893	181,369	2–1	2	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	20·47	400	273
" "	Scylla	3400	300	43	16½	9280	Poplar	Penn	1892	1893	181,010	2–1	2	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	20·62	400	273
Scout	Sentinel	2940	360	40	14¼	17,500 V.E.	Barrow	Vickers	1904	1905	282,371	1½–⅝	..	10 *12-pr.*, 8 *3-pr.*	2	25·24 *t*	150/410	268

* Re-engined and reboilered.

GREAT BRITAIN.—Cruising Ships, &c.—*continued.*

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Maker of Engines.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
												Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.						£	in.	in.			knots.	tons.	
Scout	Skirmisher	2910	360	40	14¼	17,000 V. E.	Barrow	Vickers	1905	..	283,109	1½–⅝	..	10 *12-pr.*, 8 *3-pr.*	2	25	150	268
T. G. B.	Skipjack	735	230	27	8¼	6000 R.	Chatham	Laird	1889	1890 1899	61,225							
„ „	Speedwell	735	230	27	8¼	6000 R.	Devonp'rt	Laird	1889	1890 1899	52,000	..	2	2 *4·7-in.*, 4 *3-pr.*	3	20·5	100	91
1st cl. Cr.	Spartiate shd	11,000	435	69	26	18,658	Pembroke	Maudslay	1898	1902	680,188	4–2½	4½–2	16 *6-in.*, 14 *12-pr.*, 3 *3-pr.*, 2 M.	2 (2 sub.)	21·0 *t*	1000	600
3rd cl. Cr.	Sirius shd.	3600	300	43¾	17½	9000	Elswick	Maudslay	1890	1892	195,934	2–1	2	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	19·75	400	273
T. G. B.	Speedy	810	230	27	8¾	4703 T.	Chiswick	Thornycrft	1893	1894	61,114	..	2	2 *4·7-in.*, 4 *3-pr.*	3	20·21	100	91
2nd cl. Cr.	Talbot shd.	5600	350	53½	21	9600	Devon	Devonport	1895	1897	280,119	1½–3	3	11 *6-in.*, 9 *12-pr.*, 1 *3-pr.*, 4 M., 1 l.	3 (2 sub.)	20·0	550	433
3rd cl. Cr.	Terpsichore	3400	300	43	16½	9000	Glasgow	Thomson	1890	1892	182,626	2–1	2	2 *6-in.*, 6 *4·7-in.*, 8 *6-pr.*, 1 *3-pr.*, 9 M., 1 l.	4	20·0	400	275
1st cl. Cr.	Terrible shd.	14,200	500	71	27	25,000 B.	Glasgow	Thomson	1895	1898	740,581	3–6	6	2 *9·2-in.*, 16 *6-in.*, 14 *12-pr.*, 8 *3-pr.*, 9 M., 2 *12-pr.* boat.	4	22·4	1500 / 3000	810
2nd cl. Cr.	Theseus	7350	360	60	23¾	12,000	Blackwall	Maudslay	1892	1894	377,913	5–1	6	2 *9·2-in.*, 10 *6-in.*, 12 *6-pr.*, 5 *3-pr.*, 6 M., 2 l.	2 (2 sub.)	20·0	850	544
3rd cl. Cr.	Thetis	3400	300	43	16½	9000	Glasgow	Thomson	1890	1892	182,431	2–1	2	2 *6-in.*, 6 *4·7-in.*, 8 *3-pr.*, 1 *3-pr.*, 4 M., 1 l.	4	20·0	400	273
3rd cl. Cr.	Topaze	3000	360	40	14½	9860 L.N.	Birkenh'd	Laird	1903	1905	249,075	..	..	12 *4-in.*, 8 *3-pr.*	..	22·1 *t*	300	296
2nd cl. Cr.	Venus shd.	5600	350	54	21¼	9600	Fairfield	Fairfield	1895	1898	270,390	2½	3	11 *6-in.*, 9 *12-pr.*, 7 *3-pr.*, 4 M., 1 l.	3 (2 sub.)	19·5	550	470
„ „	Vindictive	5750	320	54	20½	10,000 B.	Chatham	Chatham	1896	1899	293,434	1–2 N.S.	3	10 *6-in.* Q.F., 8 *12-pr.*, 3 *3-pr.*, 5 M., 1 l.	2	20·1 *t*	500	450
T. D. S.	Vulcan	6620	350	58	23	12,032	Portsm'th	Humphrys	1889	1894	380,831	5–2½	2	8 *4·7-in.*, 12 *3-pr.*, 16 M., 1 l.	6 (2 sub.)	20·0	1000	433

River Gunboats.—**Herald, Mosquito** (1890), 82 tons; **Jackdaw, Heron, Robin, Nightingale, Snipe** (1897), 85 tons; **Woodcock, Woodlark** (1897), 122 tons, 2 6-prs., 4 Maxims; **Teal, Moorhen** (1901), 180 tons, 2 6-prs., 13 knots; 4 recent boats in the Niger Protectorate. Recent Egyptian boats: **Melik, Sultan, Sheik,** 140 tons, 4 12-prs., 4 Maxims.

The following vessels have been struck off the effective list, but their armaments have not been removed:—*3rd Class Cruisers:* **Andromache, Apollo, Intrepid, Melampus, Naiad, Pique, Rainbow, Retribution, Spartan,** and **Tribune,** which were built under the Naval Defence Act; **Pomone** and **Pactolus** (completed 1900–1); **Medea** and **Medusa** (re-engined and reboilered last year); **Philomel** and **Pylades.** *Torpedo-Gunboats:* **Alarm, Antelope, Sheldrake.**

Royal Naval Reserved Merchant Cruisers.

—	Name.	Owners.	Length.	Breadth.	Draught of Water for the Admiralty List.	Gross Tonnage.	Indicated Horse-Power.	Ocean Speed.
			Feet.	Feet.	Feet.	Tons.		Knots.
Ships in receipt of an annual subvention and permitted to fly the blue ensign.	Caledonia	Peninsular and Oriental Co.	486	54¼	26¾	7,558	10,000	18½
	Persia	,, ,, ,,	500	54¼	26¼	7,951	9,400	18
	Arabia	,, ,, ,,	500	54¼	26¾	7,930	9,400	18
	India	,, ,, ,,	500	54¼	26¾	7,911	9,400	18
	Umbria	Cunard Co.	501½	57	26	8,120	14,500	19½
	Campania	,,	610	65	26	12,950	30,000	21
	Lucania	,,	610	65	26	12,950	30,000	21
	Teutonic	White Star Line	582	58	24½	9,984	16,000	20
	Majestic	,, ,,	582	58	24½	10,147	16,000	20
	Oceanic	,, ,,	705½	68¼	49½	17,274	26,500	21
	Danube	Royal Mail Steam Pckt. Co.	420	52	23	5,946	6,650	17
	Nile	,, ,, ,,	420	52	23½	5,946	6,650	17
	Omrah	Orient Steam Nav. Co.	490¾	56¾	24	8,291	10,000	18
	Ophir	,, ,, ,,	465	53½	25	6,910	10,000	18
	Orontes	,, ,, ,,	465	53½	25	6,910	10,000	18
	Ortona	Pacific Steam Nav. Co.	500	55¼	33½	7,945	10,000	17
	Empress of India	Canadian Pacific Rlwy. Co.	440	51	24½	5,905	10,000	16
	Empress of China	,, ,, ,,	440	51	24½	5,905	10,000	16
	Empress of Japan	,, ,, ,,	440	51	24½	5,905	10,000	16
	China	Peninsular and Oriental Co.	500½	54¼	27	7,912	9,400	18
	Egypt	,, ,, ,,	500	54¼	26¾	7,912	9,400	18
	Victoria	,, ,, ,,	466	52	22½	6,091	7,000	16
	Britannia	,, ,, ,,	466	52	22½	6,525	7,000	16
	Oceana	,, ,, ,,	466	52	22½	6,188	6,000	16
	Himalaya	,, ,, ,,	465½	52	22½	6,898	10,000	17
	Arcadia	,, ,, ,,	466	52	22½	6,188	7,000	16
	Ivernia	Cunard Co.	582	65	31¾	13,800	10,000	16
	Saxonia	,,	580	64¼	32	13,800	10,000	16
	Etruria	,,	501½	57	26	8,128	14,500	19½
Ships held at the disposition of the Admiralty without subsidy.	Suevic	White Star Co.	565½	63¼	44	12,550	4,600	12
	Gothic	,, ,,	504	53¼	37	7,755	4,400	14
	Cymric	,, ,,	599½	64	41	13,096	6,700	16
	Medic	,, ,,	565	63¼	..	11,985	4,900	12
	Ormuz	Orient Steam Nav. Co.	465½	52	26	6,387	9,000	18
	Orient	,, ,, ,,	445½	46¼	26	5,631	8,000	16
	Thames	Royal Mail Steam Pckt. Co.	436	50¼	22¼	5,645	5,740	17
	Clyde	,, ,, ,,	436	50¼	22½	5,645	5,740	17
	Tagus	,, ,, ,,	410	50	23	5,545	5,740	17
	Trent	,, ,, ,,	410	50	23	5,545	5,740	17
	Magdalena	,, ,, ,,	421	50	22¼	5,362	5,600	17
	Atrato	,, ,, ,,	421	50	20⅝	5,366	5,600	17
	Orizaba	Pacific Steam Nav. Co.	460	49¼	35¼	6,298	8,500	15½
	Oroya	,, ,, ,,	460	49¼	35¼	6,297	7,500	15½
	Oravia	,, ,, ,,	421	48¼	33	5,321	5,700	15½
	Tartar	Canadian Pacific Rly. Co.	376	47	33¼	4,425	4,900	14
	Athenian	,, ,, ,,	365	45½	29	3,382	4,600	14

The agreement with the Peninsular and Oriental Co. terminates on December 15, 1905, that with the Cunard Co. on March 24, 1906, that with the White Star Co. on December 4, 1905, that with the Orient Co. on September 22, 1905, that with the Royal Mail Steam Packet Co. on March 18, 1906, and that with the Pacific Steam Navigation Co. on October 24, 1905.

ARGENTINE REPUBLIC.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.b.	Almirante Brown .	4267	240	50	20½	4500	Poplar .	1880	1882	270,000	9 comp.	1½	8 comp.	7 comp	8 comp.	..	10 5·9-in. (Canet), 4 4·7-in., 8 2·4-in., 2 M.	2	13·75 t	650	350
a.c.	Garibaldi . .	6732	328	59¾	24	13,384	Sestri Ponente	1895	1896	752,000	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 10-in., 10 6-in., 6 4·7-in., 10 2·2-in., 10 1·4-in., 2 M.*	..	19·9 t	1000	500
a.c	General Belgrano .	7069	328	59¾	24	13,000	Leghorn .	1897	1899	696,700	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	2 10-in., 14 6-in., 2 3-in., 10 2·2-in., 8 1·4-in., 2 L., 2 M.	4 sub.	20·1 t	1000	500
a.c.	General San Martin	6773	328	59¾	24	13,000	Leghorn .	1896	1898	688,200	6–3 H.S.	1½	6 H.S.	6 H.S.	6 H.S.	6 H.S.	4 8-in., 10 6-in., 6 4·7-in., 12 2·2-in., 10 1·4-in., 2 L., 2M.*	4 sub.	19·8	1100	500
c.d.s.b.	Independencia .	2336	230	44¼	13	3000	Birkenhead .	1891	1893	176,000	8 comp.	2	..	8 comp.	8 comp.	..	2 9·4-in., 4 4·7 in. (A). 4 3-pr. (A), 4 M.	2	14·4 t	340	225
c.d.s.b.	Libertad . . .	2336	230	44¼	13	3000	Birkenhead .	1890	1892	176,000											
a.c.	Pueyrredon . .	6773	328	59¾	24	13,000 B.	Sestri Ponente	1898	1901	782,000	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	2 10-in., 10 6-in., 6 4·7-in., 10 2·2-in., 10 1·4 in., 2 M.*	4 sub.	20·1 t	1000	500

* Garibaldi, General San Martin, General Belgrano and Pueyrredon have Armstrong guns.

ARGENTINE REPUBLIC.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.v. . .	Argentina .	807	192	27	13	850	Trieste .	1883	1884	25,500	..	..	1 *6-in.*, 6 *2·7-in.* (K.), 4 M. .	..	12·0	220	120
cr. . .	Buenos Aires shd.	4780	396	47¼	19	17,000	Elswick .	1895	1895	383,000	5	4½	2 *8-in.* (A.), 4 *6-in.*, 6 *4·7-in.*, 16 *3-pr.*, 6 *1-pr.*	5	23·2* *t*	1000†	429
to.g.b. .	Espora . .	520	210	25	8	3500	Birkenhead .	1890	1891	..	..	..	3 *3-in.*, 4 *3-pr.*, 2 M. . .	5	20·0	100	124
cr. . .	Nueve de Julio	3570	354	44	19½	14,350	Elswick .	1892	1892	293,000	4½	4½	4 *6-in.* (A.), 8 *4·7-in.*, 12 *3-pr.*, 12 *1-pr.*	5	22·74 *t*	770†	300
cr. . .	Patagonia .	1419	220	32¾	12¾	2400	Trieste	1885	1887	100,000	1½	4	1 *10-in.*, 3 *6-in.*, 6 1., 10 M. .	..	13·0	350	210
to.g.b. .	Patria . .	1070	250	31	10	4500	Birkenhead .	1893	1894	87,000	..	..	2 *4·7-in.*, 4 *8-pr.*, 2 *3-pr.*, 2 M.	5	20·75 *t*	288	159
cr. . .	25 de Mayo .	3200	325	43	16	13,800	Elswick .	1890	1892	260,000	4½	4½	2 *8·2-in.* (A.), 8 *4·7-in.*, 12 *3-pr.*, 12 *1-pr.*	6	22·43 *t*	600†	185

* Natural draught. † Bunker capacity.

The training-ship (cruiser) Presidente Sarmiento, 2750 tons, 2000 I.H.P. (Niclausse boilers), and 13 knots speed, with 19 guns and three torpedo tubes; launched by Messrs. Laird, 1897. There are two old gun vessels, Paraná and Uruguay, 550 tons (1874), and several other small gunboats; also the torpedo-ram Maipù (1063 tons, 1750 I.H.P.), built in England in 1880. The Florio Company sold to the Argentine Government the steamships Arno, Regina Margherita, and Sempione to be converted into cruisers; and the Spanish firm of Pinillos, Salny & Co. the Barcelona (4020 tons register) and Cadiz (4218 tons), which have been renamed Pampa and Gaucho.

AUSTRIA-HUNGARY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above belt.	Bulkhead.	Gun Position. Heavy Guns.	Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.b.	Arpád / Babenberg	8208	354½	65¾	23¼	15,000 B.	Trieste	1901 / 1902	1903 / 1904	650,900 / 667,000	8¼ K.S.	2½	4 K.S.	8 K.S.	8¼ K.S.	5 K.S.	3 *9·4-in.*, 12 *5·9-in.*, 10 *2·8-in.*, 16 M., 2 l.	2 (sub)	19·6 t	500 / 840	638
Riv. Mon.	Bodrog	433	184	31½	4	1400	Neupesth	1904	..	..	2	1	..	..	3	1½	2 *4·7-in.*, 1 *4·7-in.* howitzer, 3 M.	..	13·0	..	..
c.d.s.	Budapest	5462	305	55¾	21	9185 B.	Trieste	1896	1897	400,600	10½ H.S.	2½	3½ H.S.	8 H.S.	10½ H.S.	3¼ H.S.	4 *9·4-in.*, 6 *5·9-in.*, 10 *1·8-in.*, 8 M.	4	17·8 t	500	450
b. / b. / b.	Erzherzog Friedrich / Erzherzog Karl / "C" (Ersatz Novara)	10433	390½	72¼	24½	14,000 Y.	Trieste	1904 / 1903 / Bldg.	..	912,500	8¼ K.S.	3	5 K.S.	8 K.S.	9¼ K.S.	7 K.S.	4 *9·4-in.*, 12 *7·5-in.*, 14 *2·8-in.*, 16 M., 2 l.	2 (sub)	19·25	1315	..
b.	Habsburg	8208	354½	65¾	23¼	15,000 B.	Trieste	1900	1902	626,000	8¼ H.S.	2½	4 H.S.	8 H.S.	8¼ H.S.	5 H.S.	3 *9·4-in.*, 12 *5·9-in.*, 10 *2·8-in.*, 16 M., 2 l.	2 (sub)	19·6 t	500 / 840	638
a.c	Kaiserin Maria Theresia	5187	351	52½	21¼	9755	Trieste	1893	1895	304,187	4	2	..	4	4	4	2 *9·4-in.*, 8 *5·9-in.*, 14 *1·8-in.*, 10 M., 2 l.	4	19·0	740	502
a.c	Kaiser Karl VI.	6151	367½	56	20¼	12,800 B.	Trieste	1898	1900	429,000	10 H.S.	1½	6 H.S.	8 H.S.	8¾ H.S.	6 H.S.	2 *9·4-in.*, 8 *5·9-in.*, 16 *1·8-in.*, 4 M., 2 l.	4	20·7 t	800	535
Riv. Mon.	Körös	437	177	29½	4	1250	Buda Pesth	1892	1893	..	2	¾	..	..	3	..	2 *4·7-in.*, 2 *2·8-in.*, 2 M.	..	10·0	..	77
b.	Kronprinz Rudolph	6830	295	62¼	25¼	6500	Pola	1887	1890	330,000	12–10	2½	..	10	10	..	3 *12-in.* (K.), 6 *4·7-in.*, 2 *1·4-in.*, 4 M., 2 l.	4	16·0	600	446
"	Kronprinzessin Stephanie	5069	278¾	55¾	21½	8000	Trieste	1887	1890	300,000	9 comp.	1	..	..	8 comp.	..	2 *12-in.* (K.), 6 *5·9-in.*, 11 *1·8-in.*, 2 *1·4 in.*, 4 M., 2 l.	4	17·0	400	423
Riv. Mon. / "	Leitha / Maros	305	166	27½	3½	700	Buda Pesth	1871	1872	20,000	1½	1	..	..	2	..	1 *4·7-in.*, 3 M.	..	8·0	20	57
c.d.s.	Monarch	5550	305	55¾	21	8900	Pola	1895	1898	399,062	10½ H.S.	2½	3½ H.S.	8 H.S.	10½ H.S.	3½ H.S.	4 *9·4-in.*, 6 *5·9-in.*, 10 *1·8-in.*, 8 M.	4	17·4 t	500	450
a. c.	St. Georg	7185	383¾	61¾	21¼	12,300 Y.	Pola	1903	..	581,583	8¼–6½ K.S.	1½	5 K.S.	7 K.S.	8¼–5¼ K.S.	6 K.S.	2 *9·4-in.*, 5 *7·5-in.*, 4 *5·9-in.*, 9 *2·8-in.*, 14 M., 2 l.	2 (sub)	21·0	..	..
Riv. Mon.	Szamos	437	177	29½	4	1250	Buda Pesth	1892	1893	..	2	¾	..	..	3	..	2 *4·7-in.*, 2 *2·8-in.*, 2 M.	..	10·0	..	75
"	Temes	433	184	31½	4	1400	Neupesth	1904	..	..	2	1	..	..	3	1½	2 *4·7-in.*, 1 *4·7-in.* howitzer, 3 M.	..	13·0	..	..
c.b.	Tegetthoff	7390	287	71	24¾	8800	Trieste	1878 1893	1881	..	14–9	3	14	12	14	..	6 *9·4-in.* (K.), 5 *5·9 in.*, 17 *1·8 in.*, 6 M, 2 l.	4	16·3 t	670	567
c.d.s.	Wien	5550	305	55¾	21	8480	Trieste	1895	1897	397,850	10½ H.S.	2½ H.S.	3½ H.S.	8 H.S.	10½ H.S.	3½ H.S.	4 *9·4-in.*, 6 *5·9-in.*, 10 *1·8-in.*, 8 M.	4	17·6 t	500	450

The old ironclads Custoza, Don Juan d'Austria, Erzherzog Albrecht, Kaiser Max, and Prinz Eugen have been removed from the list of effective ships.

AUSTRIA-HUNGARY.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
to. cr.	Aspern	tons. 2362	ft. 301¾	ft. 39½	ft. 14¼	7300 Y	Pola	1899	1901	£ 155,000	in. 2	in. ..	8 *4·7-in.*, 8 *1·8-in.*, 4 M.	1	knots. 20·0	tons. 470 / 500	289
to. g. b.	Blitz	354	193½	22¼	8	3500	Elbing	1888	1899	..	..	..	8 *1·8-in.*	4	21·0	250	59
corv.	Donau	2307	230	42¾	19¾	1800	Pola	1893	1895	..	..	..	10 *4·7-in.*(Uchatius), 4 M., 1 l.	..	12·0	320	333
cr. 2nd cl.	Kaiserin Elizabeth	4000	321½	47½	18½	8000	Pola	1890	1892	..	2¼	3½	2 *9·4-in.* (K.), 6 *5·9-in.* do., 15 *1·8-in.*, 2 *1·4-in.*, 4 M., 2 l.	5	19·0	660	418
cr. 2nd cl.	Kaiser Franz Josef I.	3966	321½	47½	18½	8000	Trieste	1889	1891	..	2¼	3½	2 *9·4-in.* (K.), 6 *5·9-in.* do., 13 *1·8-in.*, 2 *1·4-in.*, 4 M., 2 l.	5	19·0	660	426
to. g. b.	Komet	354	193½	22¼	8	3500	Elbing	1888	1889	..	..	..	9 *1·8-in.*	4	21·0	50	59
cr. 3rd cl.	Leopard	1506	224	34	14	6000	Elswick	1886	1888	200,000	..	..	2 *4·7-in.*, 10 *1·8-in.*	4	18·3	250	186
g. b.	Lussin	995	200¼	26¼	12¼	1830 Dürr.	Trieste	1883	1885	..	1½	..	2 *5·9-in.* (K.), 7 M., 1 l.	..	14·0	200	154
to. g. b.	Magnet	502	220	26¾	8	5000 T	Elbing	1896	1899	51,052	..	..	6 *1·8-in.*	3	26·0 *t*	105	80
to. g. b.	Meteor	344	187	22¼	8	3500	Elbing	1887	1889	..	..	..	9 *1·8-in.*	4	23·1	120	59
cr. 3rd cl.	Panther	1506	224	34	14	6000	Elswick	1885	1887	..	..	..	2 *4·7-in.*, 10 *1·8-in*	1	18·5	250	186
T. D. S.	Pelikan	2431	279	39¼	15½	4600	Elbing	1891	1893	..	..	..	2 *5·9-in.* (K.), 8 smaller	4	18·0	..	198
to. g. b.	Planet	492	210	23	8¼	3500	Jarrow	1889	1890	..	..	..	2 *2·8 in.*, 8 *1·8-in.*	3	19·6	78	84
to. g.b.	Satellit	531	220	26¾	9¼	4000	Elbing	1893	1893	..	1½	..	1 *2·8-in.*, 8 *1·8-in.*	..	21·87	76	84
to. cr.	Szigètvár	2313	301¾	39½	14¼	7300 Y.	Pola	1899	1901	155,000	2	..	8 *4·7-in.*, 8 *1·8-in.*, 4 M.	1	20·0	470 / 500	289
to. cr.	Tiger	1649	233	32¾	15½	5260	Trieste	1887	1889	..	..	..	4 *4·7-in.*, 10 *1·8-in.*	1	18·0	300	195
to. g. b.	Trabant	522	220	23	8¼	3500	Trieste	1890	1891	..	..	..	2 *2·8-in.*, 8 *1·8-in.*	3	20·0	..	84
to. v.	Zara	837	179½	26¼	12¼	800	Pola	1879	1880	..	..	..	7 Q.F., 5 l.	..	14·0	150	142
to. cr.	Zenta	2264	301¾	39½	12¼	7300 Y.	Trieste	1897	1899	143,780	2	..	8 *4·7-in.*, 8 *1·8-in.*, 4 M.	1	20·9 *t*	470 / 500	289

Four screw gunboats, between 540 and 870 tons displacement and 250 and 950 indicated horse-power.
Five patrol boats (30 tons, 2000 H.P.) are in hand for the Danube, two of them fitted with Parsons turbines.

BRAZIL.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkheads.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
t. River	Alagoãs .	335	120	28	4¾	180	Brazil .	1886	1888	..	4½	4½	..	..	4½	..	1 7-in. M.L.R. (Whitworth), 2 M.	..	7·0	..	43
t.	Aquidaban shd.	4950	280	52	18	6200	Poplar .	1885 1897	1887	345,000*	11 comp.	2	..	10 comp.	10 comp.	..	4 9·4-in. (Canet), 4 5·5-in., 2 smaller, 13 M.	5	15·0	600	350
t. River	Maranhao .	463	137	34½	6½	700	Rio de Janeiro	1890	1892	..	5 H.S.	..	..	..	..	..	2 4·7-in., 1 2·5-in., 5 M. .	..	12·0	..	..
c.d s., t.	Marshal Deodoro	3112	267½	48	13¼	3400	La Seyne D'A.	1898	1900	..	13¾–4 H.S.	1½	..	..	8 H.S.	3 H.S.	2 9·4-in., 2 5·9-in. howitzers, 4 4·7-in., 2 M., 4 6-pr., 2 1-pr.	2 (sub.)	15·0	236	200
c.d.s., t.	Marshal Floriano							1899	1901												
t. River	Pará . . .	463	137	34½	6½	700	Rio de Janeiro	1890	1892	..	5 H.S.	..	..	..	..	..	2 4·7-in., 1 2·5-in., 5 M. .	..	12·0	..	..
t. River	Piauhy . .	335	120	28	4¾	180	Brazil .	1887	1889	..	4½	4½	..	..	4½	..	1 7-in. M.L.R. (Whitworth) .	..	7·0	..	43
t.	Riachuelo shd.	5700	305	52	19½	7300	Poplar .	1883 1895	1888	365,000*	11 comp.	2	..	10 comp.	10 comp.	..	4 9·2-in. (Whitworth, altered by Armstrong), 6 4·7-in., 2 3-pr., 15 M.	5	16·71	800	450
t. River	Rio Grande .	335	120	28	4¾	180	Brazil .	1888	1890	..	4½	4½	..	..	4½	..	1 7-in. M.L.R. (Whitworth) .	..	7·0	..	43

* Exclusive of guns and ammunition.

Floating batteries, Brazil (1518 tons) and Lima-Barros (1444 tons). Three battleships of 13,000 tons and three armoured cruisers are projected.

BRAZIL.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			knots.	tons.	
cr.	Almirante Tamandare shd.	4660	294	46	18¼	7500	Brazil	1890	1893	..	1½	3	10 *6-in.*, 2 *4·7-in.*, 8 M.	8	17·0	750	450
”	Andrada . . . shd.	2559	252¾	34	18	3600	Bergen	1890	1892	..	..	..	2 *4·7-in.*, 2 *14-pr.*, 6 *6-pr.*, 6 *1-pr.*	5	17·0	..	300
”	Barroso . . . shd.	3600	330	43¾	16¾	7500	Elswick	1896	1897	..	3	4½ shields	6 *6-in.*, 4 *4·7-in.*, 10 *6-pr.*, 4 *1-pr.*, 4 M.	3	20·0	700	300
”	Benjamin Constant . shd.	2707	236	46	18	2800	La Seyne	1892	1894	..	2	..	4 *6-in.*, 8 *4·7-in.*, 8 M., 4 l.	4	14·0	260	287
to.cr.	Caramuru	1014	249½	30¾	10¼	6000	Kiel	1896	1897	..	½	..	2 *3·9-in.*, 6 *2·2-in.*, 2 *1·4-in.*	3	22·5	..	..
to.g.b.	Gustavo Sampaio . .	500	197	21	7¾	2500	Elswick	1893	1894	..	..	..	2 *20-pr.*, 4 *7-pr.*	3	18·0	150	95
cr.	Primeiro de Março . .	715	167½	26¼	10½	750	Brazil	1881	1883	..	..	..	7 *4·5-in.* M.L.R. (Whitworth), 4 M.	..	9·0	..	..
”	Quinze de Novembro	1300	210	35	13	3300	Elswick	1892	1894	..	2–1	..	6 *4·7-in.*, 4 *6-pr.*, 6 M.	4	17·0	170	160
to.cr.	Tamoyo	1063	269	28¾	9¾	6500	Kiel	1898	1900	..	..	4½ shields	2 *3·9-in.*, 6 *2·2-in.*, 2 *1·4-in.*, 2 M.	3	23·0	293	110
”	Timbira	1014	249½	30¾	10¼	7000	Kiel	1896	1897	..	½	4½ shields	2 *3·9-in.*, 6 *2·2-in.*, 2 *1·4-in.*, 2 M.	3	22·5	250	110
g.v.	Tiradentes . . . shd.	800	165	30	11	1200	Elswick	1892	1893	..	..	..	4 *4·7-in.*, 3 *6-pr.*, 4 M.	2	14·5	110	107
to.cr.	Tupy	1014	249½	30¾	10¼	7000	Kiel	1896	1897	..	½	4½ shields	2 *3·9-in.*, 6 *2·2-in.*, 2 *1·4-in.*, 2 M.	3	22·5	250	110

Eleven screw gunboats. 200 tons to 400 tons, eight paddle gunboats, 120 tons to 160 tons, and four 12-knot river gunboats built at Poplar.

CHILI.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
a.c.	Almirante O'Higgins shd.	8500	411¾	62½	22	16,000 B.	Elswick	1897	1898	..	7–5	2	..	..	7½–6	6	4 8-*in.*, 10 6-*in.*, 4 4·7-*in.*, 10 12-*pr.*, 10 6-*pr.*, 4 M.	3 (2 sub.)	21·5 t	1260	..
b.	Capitao Prat . . shd.	5981	328	60¾	21¾	12,000	La Seyne	1890	1893	391,000	12	3	4	..	10½	2	6 9·4-*in.* (Canet), 8 4·7-*in.* (Canet), 6 2·2-*in.*, 4 1·8-*in.*, 10 1·4-*in.*, 5 M.	4	18·3 t	775	485
a.c.	Esmeralda . . .	7020	436	53¼	22¼	16,000	Elswick	1896	1897	..	6 H.S.	2	..	6 H.S.	4½ Shields	..	2 8-*in.*, 16 6-*in.*, 8 12-*pr.*, 2 3-*pr.*, 4 M.	3 (2 sub.)	22·8 t	1350	500

The Almirante Cochrane (3500 tons), built at Hull, 1874, is used as a depôt ship.

Cruising Ships, &c.

Class	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Gun Position.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			knots.	tons.	
to.g.b.	Almirante Condell . / Almirante Lynch .	750	240	27½	10½	4500 B.	Birkenhead	1890	1892	..	..	..	3 14-*pr.*, 4 3-*pr.*, 2 M.	5	21·0	210	..
,,	Almirante Simpson.	812	240	27½	10½	4700 N.	Birkenhead	1896	1896	..	..	4½	2 4·7-*in.*, 4 3-*pr.*	3	21·0*t*	200	..
cr.	Blanco Encalada . shd.	4400	370	46½	18½	14,500	Elswick	1893	1894	..	4–1¾	..	2 8-*in.*, 10 6-*in.*, 12 3-*pr.*, 10 1-*pr.**	5	22·78 t	†900	427
,,	Chacabuco . . shd	4500	360	46	18‡	15,750	Elswick	1901	1903	..	4½–1¾	..	2 8-*in.*, 10 4·7-*in.*, 16 1·8-*in.*, 2 M., 1 l.	5	23·0	1000	..
,,	General Baquedano (Training)	2330	240	45¾	18‡	1500 B.	Elswick	1898	1900	..	..	..	4 4·7-*in.*, 2 12-*pr.*, 2 6-*pr.*, 2 M., 1 l.	1	13·7	†200	302
,,	Ministro Zenteno . shd.	3600	330¼	43¾	16¾	6500	Elswick	1896	1898	..	..	..	8 6-*in.*, 10 6-*pr.*, 4 1-*pr.**	3	20·0*t*	300 800	..
,, / ,,	Presidente Errázuriz / Presidente Pinto . shd.	2047	268	35¾	19½	5400	La Seyne	1890	1892	..	3½	..	4 6-*in.* (Canet), 2 5-*in.*, 4 2·2-*in.*, 6 M.	3	19·0	200	171

* Armstrong. † Bunker Capacity. ‡ Mean Draught.

Two Gunboats of 145 tons displacement and one of 180 tons.

CHINA.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			kts.	tons.	
cr.	Foo-Ching	2500	253	36¼	18	2400	..	1893	1895	..	4–2	4½	3 5-*in.* (K.), 4 M., 2 l.	..	16·0	..	..
to.g.b.	Fei-Ying	837	257¼	28½	12½	4500 Y.	Stettin	1895	1895	..	..	2	2 4-*in.*, 6 3·4-*in.*, 4 smaller	3	21·8 *t*	75	90
cr.	Hai-Chi.	4300	396	46¾	18½	17,000	Elswick	1898	1899	..	5	6	2 8-*in.*, 10 4·7-*in.*, 12 3-*pr.*, 4 1·4-*in.*, 6 M.	5	24·0	300	374
„	Hai-Shen							1898	1898								
„	Hai-Shew	2903	314¾	41	16	8000	Vulcan. Stettin.	1897	1898	..	3	2	3 6-*in.* (K.), 8 4-*in.*, 6 1·4-*in.* Hotchkiss, 6 M.	3 (1 sub.)	20·7 *t*	220/500	244
„	Hai-Yung							1897	1898								
„	Hi-Ying	2165	253	36¼	18	2400	..	1895	1897	..	..	..	2 8-*in.* (A.), 8 4·7-*in.*, 4 M.	1	21·0	..	..
to.cr.	Kien-Wei	861	256	26½	10½	7000 N.S.	Foochow	1900	1902	..	..	..	1 3·9-*in.*, 3 2·5-*in.*, 6 1·4-*in.*	2	22·5	360	300
„	Kien-Gnan						Foochow	1899	1902	..	..	..					
cr.	King-Ching	2100	250	36	20	2400	..	1886	1888	..	..	..	3 7-*in.* (K.), 7 40-*pr.*, 6 M.	2	14·5	360	300
to.g.b.	Kwang-Ting	1000	235	27½	11¼	3400	..	1890	1892	..	..	..	3 4·7-*in.*, 4 M., 2 l.	4	16·0	..	120
cr.	Nan-Schuin	2165	253	36¼	18	2400	Kiel	1884	1886	..	..	..	2 8-*in.* (A.), 8 4·7-*in.*, 9 M.	1	14·5	600	250
„	Nan-Ting	2165	253	36¼	18	2400	Kiel	1883	1885	..	..	..	2 8-*in.* (A.), 8 4·7-*in.*, 9 M.	1	15·0	600	250

Torpedo-gunboat Pei-Ting (349 tons), four gunboats of 411 tons, two of 300 tons, four of 215 tons (defence of Canton Roads), training vessel Tung-Chi, 1700 tons—all launched 1885–88. The Hai Tien, cruiser, 4300 tons, built at Elswick, 1897, was lost at the Elliot Islands, April, 1904.

DENMARK.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.,t.	Gorm . .	2307	231	40	14	1670	Copenhagen	1870	1873	104,000	7–4½	..	..	..	8	..	2 *10-in.* (A.) M.L.R., 3 *3·4-in.* (K.), 4 M.	..	12·25	115	158
t.	Helgoland. .	5263	257½	59¼	18¾	4000	Copenhagen	1878	1881	275,000	12–6	4	10	7	10	..	1 *12-in.* (K.), 4 *10·2-in.*, 5 *4·7-in.*, 10 M.	4	12·0	230	350
c.d.s.,t.	Herluf Trolle .	3415	271	50	16¼	4200 T.	Copenhagen	1899	1901	..	8–4 H.S	2	7 H.S.	..	6 H.S.	6 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·2-in.*, 8 smaller.	3 (sub.)	16·0	..	250
b.	Iver Hvitfeldt .	3208	242	49½	18	5100	Copenhagen	1886 1900	1889	200,000	12	2	..	9½	8	..	2 *10·2-in.* (K.), 4 *4·7-in.*, 12 M.	4	15·6	250	298
c.d.s.,t.	Lindormen .	2043	216	39½	13¾	1560	Copenhagen	1868	1870	93,000	5–3	..	..	..	6	..	2 *9-in.* (A.) M.L.R., 3 *3·4-in.* (K.), 4 M.	..	12·0	120	140
c.b.	Odin . . .	3034	237	50	15½	2260	Copenhagen	1872	1875	147,000	8–4	1½	..	7	8 comp.	..	4 *10-in.* (A.) M.L.R., 4 *3·4-in.* (K.), 7 M.	..	12·4	180	236
c.d.s.,t. *c.d.s.,t.*	Olfert Fischer } Peder Skram }	3415	271	59	18¾	4200	Copenhagen	1902 1903 Bldg.	..	..	8–4 K.S.	..	7 K.S.	..	6 K.S.	..	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·2 in.*, 8 smaller.	3 (sub.)	16·0	..	250
c.d.s.,t.	Skjold . .	2115	226½	38	13½	2200 T.	Copenhagen	1896	1899	..	9	2	..	7	8	4½	1 *9·4-in.*, 3 *4·7-in.* (K.), 4 *1·8-in.*, 1 M.	4	13·0	280	210
T. S.	Tordenskjold .	2362	221½	43¼	15½	2600	Copenhagen	1880	1883	138,900	..	4–2	..	..	8 comp.	..	1 *14-in.* (K.), 4 *4·7-in.*, 8 M.	4	14·0	170	220

DENMARK.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Fyen . . shd.	2555	226½	45½	18	2700	Copenhagen	1882	1884	170,000	1½	..	18 5·9-*in.* (K.), 8 M.	2	13·0	290	407
3rd cl. *cr.*	Geiser . . .	1260	257½	27½	11¼	3000 T.	Copenhagen	1892	1893	..	1½	..	2 4·7-*in.*, 4 3·4-*in.*, 6 M.	4	17·1 *t*	125	155
”	Heimdal . .	1260	257½	27½	11¼	3000 T.	Copenhagen	1894	1896	..	1½	..	2 4·7-*in.*, 4 3-*pr.*, 6 M.	4	17·5	125	155
”	Hekla . . .	1260	233	32¾	11¼	3000 T.	Copenhagen	1890	1893	..	1½	..	2 6-*in.*, 4 2·2-*in.*, 6 M.	4	17·0	125	155
cr.	Valkyrien . .	2854	268	43½	18	5300	Copenhagen	1887 1896	1890	..	2½	..	2 8·2-*in.* (K.), 6 5·9-*in.*, 4 Q.F., 10 M.	5	17·0	450	300

Gunboats.—Five (*Lille Belt, Öresund, Store Belt, Grönsund, Guldborgsund*), of 150 to 240 tons, 200 to 400 I.H.P.
Esbern Snare (torpedo school-ship), 530 tons, 2-in. belt.
Dagmar (training-ship), corvette, 1200 tons; ***Hjaelperen*** (mining), 280 tons; *Sleipnir* (ice-breaker), 1260 tons, 3000 I.H.P. Training-brig *Örnen* in hand.
The *Beskytteren*, torpedo transport, 389 tons, 600 I.H.P., B. & W. boilers, 3 1·8-in. Q.F., launched 1900.

FRANCE.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.g.b.	**Achéron** . .	1693	181	40¼	11¾	1700	Cherbourg.	1885 1900	1887	100,000	9½–6 *comp.*	2½	..	..	8 *comp.*	..	1 *10·8-in.*, 3 *3·9-in.*, 2 *1·8-in.*, 4 M.	..	13·0	100	101
a.c.	**Aube** (Amiral) .	9856	453	66¼	24½	22,155 *t* B.	St. Nazaire	1902	1904	973,440	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 26 small Q.F. and M.	4 (2 sub.)	21·9 *t*	970 / 1590	615
b.	**Baudin** . .	10,884	321½	69¾	26¼	8320	Brest .	1883 1899	1885	600,000	14–10	4	..	..	16½	4½	2 *14·5-in.*, 4 *6·4-in.*, 8 *5·5-in.*, and 17 *1·8-in.*	4	15·0	800	630
t.	**Bouvet** . .	12,007	401¼	70¼	27½	14,000 B.	Lorient .	1896	1898	1,100,770	15¾–8 H.S.	3½	4 H.S.	..	14½ H.S.	4 H.S.	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 8 *3·9-in.*, 19 small Q.F. and M.	4 (2 sub.)	18·2 *t*	621	621
t.	**Bouvines** .	6691	293¾	58¼	23¼	8400 A'D.	La Seyne .	1892	1894	594,640	17¾	4	..	..	14½	..	2 *12-in.*, 8 *3·9-in.*, 4 *1·8-in.*, 10 *1·4*-in. M.	2	16·05 *t*	300	323
t.	**Brennus** . .	11,190	361	67	26¼	14,000 B.	Lorient .	1891	1895	991,767	15¾ *comp.*	4	4¾ *comp.*	..	17¾ *comp.*	4¾ *comp.*	3 *13·4-in.*, 10 *6·4-in.*, 26 small Q.F. and M.	4	17·1 *t*	800	696
a.c.	**Bruix** . .	4735	365¼	46	19¾	9049 B.	Rochefort .	1894	1896	409,622	3¾–2¾	2	3¾	..	3¾	3¾	2 *7·6-in.*, 6 *5·5-in.*, 4 *2·5-in.*, 4 *1·8-in.*, 4 *1·4-in.*, M.	4	18·3 *t*	406	391
t.	**Caïman** . .	7050	278¼	59	24½	6000	Toulon .	1885 1892	1887	..	19½	3	..	..	10 H.S.	..	2 *10·8-in.*, 6 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*, 2 M.,	4	14·5 *t*	400 / 800	332
t.	**Carnot** . .	11,954	382¼	70½	27½	16,300 *t* D'A.	Toulon .	1894	1896	1,070,088	17¾–9 *comp.*	2¾	4	..	14½	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 4 *2·5-in.*, 16 *1·8-in.*, 10 *1·4-in.*	4 (2 sub.)	17·86 *t*	705	625
a.c.	**Chanzy** . .	4736	348	46	19¼	8300 B.	Bordeaux .	1894	1896	360,000	3¾–2¾	2	3¾	..	3¾	3¾	2 *7·6-in.*, 6 *5·5-in.*, 4 *2·5-in.*, 6 *1·8-in.*. 6 *1·4-in.*, M.	4	19·0	413	375
t.	**Charlemagne** .	11,108	385½	66½	27½	14,500 B.	Brest .	1895	1898	1,096,432	15¾ H.N.	3½	3 H.N.	..	15¾ H.N.	3 H.N.	4 *12-in.*, 10 *5·5-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 10 *1·4-in.*, 8 M.	4 (2 sub.)	18·1 *t*	680 / 1100	631
t.	**Charles Martel**.	11,693	392½	71	27½	14,996 *t* D'A.	Brest .	1893	1897	1,092,830	17¾	3½	4	..	15¾	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 4 *2·5-in.*, 14 *1·8-in.*, 5 *1.4-in.*	6	18·1 *t*	677	632

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Complet on.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Charner	4702	348	46	19½	8300 B.	Rochefort	1893	1895	353,200	3¾–2¾	2	3¾	..	3¾	3¾	2 *7·6-in.*, 6 *6·5-in.*, 14 small Q.F. and M.	5	18·2 *t*	413	375
a.g.b.	Cocyte	1688	181¾	40¼	11¾	1700	Cherbourg	1887	1889	100,000	9½–6 *comp.*	2½	..	..	8 *comp.*	..	1 *10·8-in.*, 2 *3·9-in.*, 2 *1·8-in.*, 4 M.	..	13·0	100	101
a.c.	Condé	9856	453	63¾	24½	22,175 Nic.	Lorient	1902	1904	863,799	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	5 (2 sub.)	21·4 *t*	970 1590	615
c.b.&b.	Courbet	10,196	312	67	25	8100	Toulon	1881 1899	1884	800,000	15–9	2½	..	12	9½	4½ shield.	4 *10·8-in.*, 3 *9·4-in.*, 11 *5·5 in.*, 6 *1·8-in.*, 18 M.	5	15·4 *t*	1000	669
t.	Démocratie	14,635	438¾	79½	27½	18,000	Brest	1904	..	1,421,708	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	18·0	905 1825	793
a.c.	Desaix . shd.	7578	426½	58¼	24¼	17,715 *t* B.	St. Nazaire	1901	..	762,759	4–3 H.S.	2¾	..	..	3½ H.S.	..	8 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*	2	21·7 *t*	880 1200	531
c.b.&b.	Dévastation	10,095	312	67	25	8320 B.	Lorient	1879 1901	1882	..	15–9	2½	..	12	9½	4½	4 *10·8-in.*, 2 *9·4-in.*, 14 *3·9-in.*, 24 smaller Q.F., 14 M.	4	15·17 *t*	950	685
b.	Duperré*	11,032	311	67	26¾	8120	La Seyne	1879	1882	570,000	21–10	2¼	..	..	12	6	3 *13·3-in.*, 4 *6·4-in.*, 1 *5·5-in.*, 14 *4-in.*, 42 small Q.F. and M.	4	14·22 *t*	850	664
a.c.	DupetitThouars	9367	452¾	63¾	24½	19,600 B.	Toulon	1901	..	831,839	6 H.S.	2	3¾ H.S.	6 H.S.	6 H.S.	3¾ H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	(2 sub.)	21·0	† 1020 1600	610
a.c.	Dupleix . shd.	7578	426½	58¼	24¼	17,100 B.	Rochefort	1900	1903	652,354	4–3 H.S.	2¾	..	..	3½ H.S.	..	8 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*	2	21·0	880 1200	531
a.c.	Dupuy de Lôme	6676	374	51½	26¾	14,000 N.S.	Brest	1890	1893	416,000	4	2	4	..	4	4	2 *7·6-in.*, 6 *6·4-in.*, 12 *2·5-in.* and *1·8-in.*, 8 M.	4	20·0	900	515
a.c.	Edgard Quinet	13,481	528	70¼	26¼	36,000	Brest	Bldg	..	..	6–3½	2½	5	..	8	5½	4 *7·6-in.*, 16 *6·4-in.*, 24 *1·8-in.*, 2 *1·4-in.*	2 (1 sub.)	23·0	1500 2300	696
a.c.	Ernest Renan	13,427	515	70¼	26¾	36,000	St. Nazaire	Bldg	..	..	6¾–4 H.S.	2	5–3 H.S.	..	8 H.S.	5 H.S.	4 *7·6-in.*, 12 *6·4-in.* 21 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	23·0	2250	728
a.g.b	Flamme	1124	515	32½	10¼	1500	Cherbourg	1885	1887	68,000	10–7	2	..	..	8	4	1 *9·4-in.*, 1 *3·5-in.*, 4 M.	1	13·0	120	84
b.	Formidable	10,878	321½	69½	26¼	9700	Lorient	1885 1899	1888	467,520	14–10	3	..	..	16¼	4½	2 *14·5-in.*, 4 *6·4-in.*, 8 *5·5-in.*, 17 *1·8-in.*	4	16·0	900	640
c.d.s.,t.	Fulminant	5871	248	57¾	21¼	4500	Cherbourg	1877	1879	..	13–10 *iron*	2	12	12	12	..	2 *10·8-in.*, 4 *1·8-in.*, 6 M.	2	13·8 *t*	400	248
c.d.s., b.	Furieux	5925	248	59	21¾	5033 B.	Cherbourg	1883 1904	1885	264,640	20–13 *comp.*	3½	..	..	9 K.S.	..	2 *10·8-in.*, 4 *3·9-in.*, 4 *2·5 in.*, 8 *1·8-in.*	2	14·3 *t*	290	248
a.g.b.	Fusée . shd.	1124	165	32½	10¼	1500	Lorient	1884	1886	68,000	10–7 *comp.*	2	..	..	4 *comp.*	..	1 *9·4-in.*, 1 *3·5-in.*, 4 M.	1	13·0	120	84
t.	Gaulois	11,105	385½	66¼	27½	11,500 B.	Brest	1896	1898	1,093,925	15¾ H.N.	3½–1½	3 H.N.	..	15¾ H.N.	3 H.N	4 *12-in.*, 10 *5·5-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 10 *1·4-in.*, 8 M.	6 (2 sub.)	18·0	680 1100	632
a.c.	Gloire	9856	453	63¾	24½	20,500 Nic.	Lorient	1900	1904	883,269	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	5 (2 sub.)	21·0	970 1590	615
a.g.b.	Grenade . shd.	1073	165	32½	10¼	1500	Lorient	1888	1890	68,000	10–7	2	..	..	8	4	1 *9·4-in.*, 1 *3·5-in.*, 4 M.	1	13·0	120	84
a.c.	Gueydon (Amiral)	9367	459	63¾	24½	20,200 Nic.	Lorient	1899	1902	817,994	6–3¾ H.S.	2	3¾ H.S.	6 H.S.	6 H.S.	3¾ H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	1020 1600	610
t.	Henri IV.	8807	354½	72	23	11,500 Nic.	Cherbourg	1899	1903	801,248	11–7 H.S.	3	4¾ H.S.	..	11¾ H.S.	5 H.S.	2 *10·8-in.*, 7 *5·5-in.*, 12 *1·8-in.*, 2 M.	2 (sub.)	17·2 *t*	735 1100	464
t. & b.	Hoche	10,581	333	65½	27¼	11,300 B.	Lorient	1886 1900	1889	700,000	18–14 *comp.*	3	3	..	16 *comp.*	..	2 *13·4-in.*, 2 *10·8-in.*, 12 *5·5-in.*, 4 *2·5-in.*, 9 *1·8-in.*, 12 *1·4-in.*, 8 M.	5	16·0	800	660
t.	Iéna	11,861	400¾	68¼	27½	16,500 *t* B.	Brest	1898	1901	1,111,340	13¾ 6 H.S.	2½	5–4 H.S.	..	..	4 H.S.	4 *12-in.*, 8 *6·4-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 5 *1·4-in.*, 13 *1·4-in.* M.	4 (2 sub.)	18·2 *t*	820 1100	631
t.	Indomptable	7105	279¾	59	23¼	6605 Nic.	Lorient	1883 1902	1886	..	19½ *comp.*	3	..	..	10 H.S.	..	2 *10·8-in.*, 6 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*, 2 M.	4	14·8 *t*	400 800	332
t.	Jauréguiberry	11,637	364	72¾	27¾	15,800 D'A.	La Seyne	1893	1896	1,069,536	17¾	2¾	4	..	14½	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in*, 4 *2·5-in.*, 12 *1·8-in.*, 8 *1·4-in.*, 8 M.	6	18·07 *t*	700	625
a.c.	Jeanne d'Arc	11,092	477¼	63¾	26¼	28,000 Guyot	Toulon	1899	1903	875,847	6–3 H.S.	2·2	3 H.S.	..	6 H.S.	5 H.S.	2 *7·6-in.*, 14 *5·5-in.*, 16 *1·8-in.*, 8 *1·4-in.*, 2 M.	2 (sub.)	21·7 *t*	1400 2000	626
c.d.s.,t.	Jemmapes	6474	284	57¾	22	9250 D'A.	St. Nazaire	1892	1894	525,000	17¾–10	4–2¾	..	..	17¾	..	2 *13·4-in*, 4 *3·9-in.*, 4 *1·8-in.*, 10 *1·4-in.*, M.	2	16·7 *t*	300	334
a.c.	Jules Ferry	12,351	480½	70¼	27	27,500 Guyot	Cherbourg	1903	..	1,169,940	6¾–4 H.S.	2	5–3 H.S.	6	6 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 22 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	21·0	1320 2100	728

* Reconstruction of Duperré deferred. Proposed new armament given.

† Including liquid fuel.

FRANCE.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Belt.	Armour: Deck.	Armour: Side above Belt.	Armour: Bulkhead.	Gun Position: Heavy Guns.	Gun Position: Secondary.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
a.c.	**Jules Michelet.**	12,370	480½	70¼	27	27,500 Guyot	Lorient	Bldg.	..	1,183,800	6–4 K.S.	2	5–3 K.S.	6 H.S.	8 K.S.	5 K.S.	4 *7·6-in.*, 12 *6·4-in.*, 22 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	23·0	1320 / 2100	728
t.	**Justice**	14,635	438¾	79½	27½	18,000 W.T.	La Seyne	1904	..	1,421,708	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	18·0	905 / 1825	793
a.c.	**Kléber** . shd.	7578	426½	58½	24½	18,000 Nic.	Bordeaux	1902	1903	770,320	4–3 H.S.	2¾	..	..	3½ H.S.	..	8 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.* 4 *1·4-in.*	2	21·2 *t*	880	531
a.c.	**Latouche-Tréville**	4681	348	46	19½	8300 B.	Havre	1892	1893	360,000	3¾–2¾	2	3¾	..	3¾	3¾	2 *7·6-in.*, 6 *5·5-in.*, 4 *2·5-in.*, 4 *1·8-in.*, 6 *1·4-in.*, M.	4	18·2 *t*	1200 / 406	375
a.c.	**Léon Gambetta**	12,351	480½	70¼	27	27,500 Nic.	Brest	1901	1904	1,169,940	6¾–4 H.S.	2	5–3 H.S.	6	8 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 22 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	22·0	1320 / 2100	728
t.	**Liberté**	14,635	434¾	79½	27½	18,000 B.	St. Nazaire	Bldg.	..	1,421,708	11 H.S.	..	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	18·0	905 / 1825	793
b.	**Magenta**	10,680	330	65½	27½	12,000	Toulon	1890 / 1901	1893	760,960	18–12	3	..	..	16	2 screen.	4 *13·4-in.*, 17 *5·5-in.*, 4 *2·5-in.*, 12 *1·8-in.*, 8 M.	3	16·25 *t*	800	660
b.	**Marceau**	10,558	330	65½	27¼	14,000 Nic.	La Seyne	1887 / 1901	1890	769,080	18	3	..	..	16	2 screen.	4 *13·4-in.*, 17 *5·5-in.*, 4 *2·5-in.*, 12 *1·8-in.*, 8 M.	6	16·4 *t*	800	660
a.c.	**Marseillaise**	9856	453	63¾	24½	20,500 B.	Brest	1902	1903	881,270	6–4 H.S.	2	5–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 2 *2·5-in.*, 18 *1·8-in.*, 6 *1·4-in.*	4 (2 sub.)	21·0	970 / 1590	615
t.	**Masséna**	11,735	384¾	66	27	13,500 D'A.	St. Nazaire	1895	1898	1,100,400	17¾–9¾	3½	4 H.S.	16	15¾15¾ H. S.	4	2 *12-in.*, 2 *10·8-in.*, 8 *5·5-in.*, 8 *3·9-in.*, 12 *1·8-in.*, 12 *1·4-in.*	6 (2 sub.)	17·1 *t*	630	642
a.g.b.	**Mitraille** . shd.	1110	165	32½	10½	1500	Rochefort	1886	1888	70,000	10–7 comp.	2	..	..	4 comp.	..	1 *9·4-in.*, 1 *3·5-in.*, 4 M.	..	13·0	120 †	84
a.c.	**Montcalm**	9367	452¾	63¾	24½	19,600 N.S.	La Seyne	1900	1902	902,809	6 H.S.	2	3¾ H.S.	6 H.S.	6 H.S.	2¾ H.S.	2 *7·6-in.*, 8 *6·4-in.*, 4 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	2 (sub.)	21·0	1020 / 1600	612
b.	**Neptune** *	10,810	330	65½	27½	12,000 B.	Brest	1887	1892	780,000	18	3	..	..	16	2 screen.	4 *13·4-in.*, 17 *5·5-in.*, 4 *2·5-in.*, 12 *1·8-in.*, 8 M.	5	16·02 *t*	800	660
t.	**Patrie**	14,635	438¾	79½	27½	18,000 Nic.	La Seyne	1903	..	1,421,708	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 18 *6·4-in.*, 26 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	18·0	905 / 1825	793
a.g.b.	**Phlégéton**	1767	187	40½	11¾	1700	Cherbourg	1890	1892	142,000	9–6 comp.	2	..	..	8 comp.	..	1 *10·8-in.*, 1 *5·5-in.*, 4 *1·8-in.*, 4 M.		12·4 *t*	72	101
a.c.	**Pothuau**	5374	370½	50½	21	10,398 B.	Havre	1895	1896	384,000	3½–2	3⅜	2½	..	9½	5½	2 *7·6-in.*, 10 *5·5-in.*, 16 *1·8-in.*, 8 *1·4-in.*	..	19·2 *t*	538	461
c.b. & b.	**Redoutable**	9164	318½	64¾	25½	6071	Lorient	1876 / 1896	1879	..	14–9	2½	..	9½	9½	..	4 *10·8-in.*, 4 *9·4-in.*, 6 *3·9-in.*, 14 *1·8-in.*, 12 M.	4	14·66 *t*	1000	700
t	**République**	14,635	438¾	79½	27½	18,000 N.	Brest	1902	..	1,421,708	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 18 *6·4-in.*, 26 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	18·0	905 / 1825	793
b.	**Requin**	7078	279¾	59	24½	7000 Nic.	Bordeaux	1885 / 1902	1888	..	19½ comp.	3	..	..	10 H.S.	..	2 *10·8-in.*, 6 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*, 12 M.	4	15·0	400 / 800	332
t.	**Saint Louis**	11,090	385½	66½	27½	14,500 B.	Lorient	1896	1900	1,080,997	15¾ H.N.	3½	3 H.N.	..	3–15¾ H.N.	3 H.N.	4 *12-in.*, 10 *5·5-in.*, 8 *3·9-in.*, 16 *1·8-in.*, 10 *1·4-in.*, 8 M.	4 (2 sub.)	18·0	820 / 1150	631
a.g.b.	**Styx**	1767	187	40½	11¾	1700	Cherbourg	1892	1893	142,000	9–6 comp.	2	..	..	8 comp.	..	1 *10·8-in.*, 1 *5·5-in.*, 4 *1·8-in.*, 4 M.	..	13·0	72	101
t.	**Suffren**	12,527	411¾	70¼	27½	16,500 Nic.	Brest	1899	1903	1,195,564	12–8 H.S.	2¾	5–3 H.S.	..	12 H.S.	6–5	4 *12-in.*, 10 *6·4-in.*, 8 *3·9-in.*, 20 *1·8-in.*, 2 *1·4-in.*	4 (2 sub.)	18·0	1100 / 1820	615
a.c.	**Sully** ‡	9856	453	63¾	24½	20,000 B.	La Seyne	1901	1903	954,536	6–4 H.S.	2	5½–2 H.S.	..	7½ H.S.	6½–5 H.S.	2 *7·6-in.*, 8 *6·4-in.*, 6 *3·9-in.*, 16 *1·8-in.*, 6 *1·4-in.*	5 (2 sub.)	21·0	970 / 1590	..
c.d.s., t.	**Tempête**	4793	248	57¾	16¾	2193	Brest	1876	1879	..	13–10 iron	2	12 iron	12 iron	12 iron	..	2 *10·8-in.*, 4 *1·8-in.*, 6 M.	2	11·7 *t*	200	197
b.	**Terrible**	7206	279¾	59	24½	6230	Brest	1881 / 1902	1884	..	19½ comp.	3	..	..	10 H.S.	..	2 *13·4-in.*, 6 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.*	4	14·5 *t*	400 / 800	332
c.d.s., t.	**Tonnerre**	5765	248	57¾	21½	4165	Toulon	1875	1877	..	13–10 iron	2	12 iron	12 iron	12 iron	..	2 *10·8-in.*, 4 *1·8-in.*, 6 M.	2	14·01 *t*	400	249
t.	**Tréhouart**	6671	293½	58½	23½	8500 B.	Lorient	1893	1896	593,100	17¾	4	..	..	14½	..	2 *12-in.*, 8 *3·9-in.*, 4 *1·8-in.*, 4 *1·4-in.*, 8 M.	2	15·76 *t*	300	337
c.d.s., t.	**Valmy**	6477	293¾	57½	23½	8954	St. Nazaire	1892	1895	578,957	17¾	4	..	..	17¾	..	2 *13·4-in.*, 4 *3·9-in.*, 4 *1·8-in.*, 10 M.	2	16·7 *t*	300	297
a.c.	**Vauban**	6110	267¾	57	24	4560	Cherbourg	1882	1885	..	9 comp.	2	..	..	8 comp.	..	4 *9·4-in.*, 1 *7·6-in.*, 6 *5·5-in.*, 12 M.	2	14·32 *t*	550	440
c.d.s., t.	**Vengeur**	4635	248	57¾	16	2030	Cherbourg	1878	1880	..	13–10 iron	2	12 iron	12 iron	12 iron	..	2 *12·5-in.*, 4 *1·8-in.*, 6 M.	2	10·83 *t*	200	107
t.	**Vérité**	14,635	438¾	79½	27½	18,000 W.T.	Bordeaux	Bldg.	..	1,421,708	11–7 H.S.	2¾	8 H.S.	..	12 H.S.	6 H.S.	4 *12-in.*, 10 *7·6-in.*, 26 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	18·0	905 / 1825	822
a.c.	**Victor Hugo**	12,351	480½	70¼	27	27,500 W.T.	Lorient	1904	..	1,169,940	6¾–4 H.S.	2	5–3 H.S.	6	8 H.S.	5 H.S.	4 *7·6-in.*, 16 *6·4-in.*, 22 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	22·0	1320 / 2100	728
a.c.	**Waldeck Rousseau**	13,427	528	70½	27	36,000	Lorient	Pro.	..	..	6–3½	2½	5	..	8	5½	4 *7·6-in.*, 16 *6·4-in.*, 24 *1·8-in.*, 2 *1·4-in.*	5 (2 sub.)	23·0	1500 / 2300	696

* Reconstruction deferred.—Boilers defective. † Including liquid fuel. ‡ Wrecked at Tonkin. An effort is being made to float her.

FRANCE.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. *cr.*	**Alger**	4313	346	45¼	19½	8254 B.	Cherbourg	1889	1893	280,000	3½	..	4 *6·4-in.*, 6 *5·5-in.*, 10 smaller, 10 M.	4	19·61 *t*	860	325
to. g. b.	**Bombe**	413	196¾	21½	5¾	2000 D'A.	Havre	1885	1886	..	..	..	4 *1·8-in.*, 3 M.	2	18·0	100	63
3rd cl. *cr.*	**Bugeaud**	3809	308½	43½	20½	9000 B.	Cherbourg	1893	1896	308,650	3	2 shield	6 *6·4-in.*, 4 *3·9-in.*, 8 *1·8-in.*, 11 *1·4-in.*	6	18·9 *t*	587	358
to. g. b.	**Casabianca**	974	262½	26¾	11½	5200 D'A.	Bordeaux	1895	1896	98,985	½	..	1 *3·9-in.*, 3 *2·5-in.*, 5 *1·8-in.*, 4 *1·4-in.*	..	22·0	116	143
3rd cl. *cr.*	**Cassard**	3890	325½	45	20½	10,143 D'A.	Cherbourg	1896	1898	318,712	3	2 shield	6 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 3 *1·4-in.*, 2 M.	2	19·8 *t*	630	385
to. g. b.	**Cassini**	966	262½	27¼	11½	5500 D'A.	Bordeaux	1894	1894	98,500	½	..	1 *3·9-in.*, 3 *2·5-in.*, 4 *1·4-in.*	2	21·2 *t*	110	118
3rd cl. *cr.*	**Catinat** shd.	4048	331¾	44½	21	9000 B.	Havre	1896	1897	324,992	3	2 shield	4 *6·4-in.*, 10 *3·9-in.*, 10 *1·8-in.*, 4 *1·4-in.* M.	2	19·0	563	384
2nd cl. *cr.*	**Cécille**	5839	378¾	49¼	19¾	10,200	La Seyne	1888	1890	299,666	4	..	8 *6·4-in.*, 10 *5·5-in.*, 6 *1·8-in.*, 14 M.	4	19·0	940	486
3rd cl. *cr.*	**Chasseloup-Laubat**	3824	308½	43½	20¾	9000 D'A.	Cherbourg	1893	1894	256,320	3	..	6 *6·4-in.*, 4 *3·9-in.*, 8 *1·8-in.*, 12 *1·4-in.*, M.	6	19·25 *t*	587	358
2nd cl. *cr.*	**Châteaurenault** shd.	7898	442¾	55¾	24½	24,300 *t* N.S.	La Seyne	1898	1902	606,656	2½	2 shield	2 *6·4-in.*, 6 *5·5-in.*, 10 *1·8-in.*	..	24·19 *t*	1400 / 2100	625
3rd cl. *cr.*	**Coëtlogon**	1901	312	30¼	14	5800	St. Nazaire	1889	1894	134,000	1½	..	4 *5·5-in.*, 3 other Q.F., 4 M.	5	19·3 *t*	200	190
to. cr.	**Condor**	1229	216½	29¼	15¼	3800	Rochefort	1885 1896	1886	80,000	1½	..	5 *3·9-in.*, 1 *2·5-in.*, 6 M.	5	17·7 *t*	160	134
3rd cl. *cr.*	**Cosmao**	1923	312	30½	14	6000	Bordeaux	1888	1890	133,000	1½	..	4 *5·5-in.*, 8 other Q.F., 4 M.	5	20·5 *t*	200	190
to. g. b.	**Couleuvrine**	369	196¾	21½	6	2047	Havre	1885	1886	33,778	..	..	4 *1·8-in.*, 3 M.	2	18·0	100	63
to. g. b.	**Dague**	402	196¾	21½	6	2000	Havre	1885	1886	36,119	..	..	4 *1·8-in.*, 3 M.	2	18·0	100	63
3rd cl. *cr.*	**D'Assas**	3962	325½	45	20½	9500 D'A.	St. Nazaire	1896	1898	292,682	3	2 shield	6 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 11 *1·4-in.*	2	19·25 *t*	630	393
3rd cl. *cr.*	**Davout**	3031	295¼	40	17½	9000 Nic.	Toulon	1890	1902	221,827	3	..	6 *6·4-in.*, 4 *3·9-in.*, 4 *2·5-in.*, 4 *1·8-in.*, 6 M.	4	20·07 *t*	600	336
g. v.	**Décidée**	635	184¾	26¼	12½	1000 Nic.	Lorient	1899	1900	54,100	..	..	2 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	13·0	99	99
2nd cl. *cr.*	**D'Entrecasteaux** shd	7995	383½	58½	25¾	13,500	La Seyne	1896	1898	667,740	4	10–3 H.S.	2 *9·4-in.*, 12 *5·5-in.*, 12 *1·8-in.*	6	19·2 *t*	650	521
3rd cl. *cr.*	**Descartes** shd.	3970	326	42¼	21¾	9000 B.	St. Nazaire	1894	1896	334,725	1½	..	4 *6·4-in.*, 10 *3·7-in.*, 8 *1·8-in.*, 4 *1·4-in.*	2	21·0 *t*	552	386
3rd cl. *cr.*	**D'Estrées** shd.	2421	311¾	39¼	17¾	8500 Nor.	Rochefort	1897	1900	208,200	1½	..	2 *5·5-in.*, 4 *3·9-in.*, 8 *1·8-in.*, 2 *1·4-in.*	..	20·5 *t*	345 / 480	234
to. g. b.	**D'Iberville**	952	262½	27	11¼	5060 D'A.	St. Nazaire	1893	1894	99,120	½	..	1 *3·9-in.*, 1 *2·5-in.*, 4 *1·4-in.*	6	21·4 *t*	117	118
to. g. b.	**Dragonne**	403	196¾	21½	6	2000	Havre	1885	1886	36,074	..	..	4 *5·5-in.*, 3 M.	2	18·0	100	63
3rd cl. *cr.*	**Du Chayla** shd.	3890	325½	45	20½	10,009 D'A.	Cherbourg	1895	1897	315,835	3	2 shield	6 *6·4-in.*, 4 *3·9-in.*, 10 *1·8-in.*, 3 *1·4-in.*, 2 M.	2	20·2 *t*	624	385
to. g. b.	**Dunois**	889	256	27¾	12¾	7000 N.S.	Cherbourg	1897	1898	123,383	..	..	6 *2·5-in.*, 6 *1·8-in.*	..	23·0	137	128
to. cr.	**Epervier**	1268	216½	29¼	15½	3200	Rochefort	1885	1887	80,000	1½	..	5 *3·9-in.*, 1 *2·5-in.*, 6 M.	5	17·6 *t*	160	134
to. cr.	**Faucon**	1311	216½	29¼	15½	3200	Toulon	1887	1888	80,000	1½	..	5 *3·9-in.*, 1 *2·5-in.*, 6 M.	5	18·0	150	134
to. g. b.	**Flèche**	418	196¾	21½	6	200	Havre	1885	1886	37,517	..	..	4 *1·8-in.*, 3 M.	2	18·0	100	63
3rd cl. *cr.*	**Fleurus**	1289	229¾	29¼	15¼	4000 Nic.	Cherbourg	1893	1898	128,530	..	..	5 *3·9-in.*, 6 *1·8-in.*, 4 M.	..	17·6 *t*	118	179
3rd cl. *cr.*	**Forbin**	1935	312	30½	16	5700	Rochefort	1888	1900	123,739	1½	..	4 *5·5-in.*, 8 other Q.F., 4 M.	5	20·6	200	190
T.D.S.	**Foudre**	5984	370½	52½	23½	11,900 *t* D'A.	Bordeaux	1895	1897	407,712	3½	..	10 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	19·9 *t*	840	410
3rd cl. *cr.*	**Friant**	3882	308½	43½	20¾	9000 Nic.	Brest	1893	1894	308,750	3	..	6 *6·4-in.*, 4 *3·9-in.*, 8 *1·8-in.*, 6 *1·4-in.*	2	18·19	587	358

FRANCE.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. *cr.*	**Galilée**	2318	330¼	34½	17¾	6600 B.	Rochefort	1896	1897	208,152	1½	2 shield	4 *5·5-in.*, 2 *3·9-in.*, 8 *1·8-in.*, 8 *1·4-in.*	..	20·0	226	248
2nd cl. *cr.*	**Guichen** . shd.	8151	436¼	54¾	24½	24,000 D'A.	St. Nazaire	1897	1902	611,945	2½	2 shield	2 *6·4-in.*, 6 *5·5-in.*, 10 *1·8-in.*	..	23·0	1460	625
3rd cl. *cr.*	**Infernet** . shd	2435	311¾	39¼	15½	8500 Nor.	Bordeaux	1899	1900	193,000	..	..	2 *5·5-in.*, 4 *3·9-in.*, 8 *1·8-in.*	..	20·5	345/480	234
3rd cl. *cr.*	**Isly**	4406	346	43½	19½	8100	Brest	1891	1892	252,760	3	..	4 *6·4-in.*, 6 *5·5-in.*, 14 *2·5-in.* and *1·8-in.*, 8 M.	5	18·3	880	332
2nd cl. *cr.*	**Jurien de la Gravière** shd.	5595	440	48¾	22	17,000 Guyot	Lorient	1899	1901	475,979	3	..	8 *6·4-in.*, 12 *1·8-in.*	2	22·9 *t*	600/900	511
3rd cl. *cr.*	**Jean Bart**	4044	346	43½	19½	10,000 Nic.	Rochefort	1889	1891	283,240	4	..	4 *6·4-in.*, 6 *5·5-in.*, 14 *2·5-in.* and *1·8-in.*, 8 M.	5	19·0	940	332
g. v.	**Kersaint** . shd.	1223	226	34½	15	2200	Rochefort	1897	1898	107,933	..	..	1 *5·5-in.*, 5 *3·9-in.*, 7 *1·4-in.*	..	15·0	199	110
to. g. b.	**La Hire**	889	256	27¾	12¾	7000 N.S.	Cherbourg	1898	1899	123,383	..	..	6 *2·5-in.*, 6 *1·8-in.*	..	23·0	137	128
3rd cl. *cr.*	**Lalande**	1968	311½	31¼	14	6000	Bordeaux	1888	1900	133,800	1½	..	6 *5·5-in.*, 8 other Q.F., 4 M.	5	22·0	200	190
to. g. b.	**Lance**	395	196¾	21½	5¾	2000 Du T.	Havre	1886	1887	39,964	..	..	4 *1·8-in.*, 3 M.	2	18·0	100	63
3rd cl. *cr.*	**Lavoisier**	2285	330½	34½	17¾	6400 B.	Rochefort	1897	1899	202,024	1½	2 shield	4 *5·5-in.*, 2 *3·9-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 4 M.	2	20·0	226	248
to. g. b.	**Léger**	509	197	23	10½	2360 B.	Lorient	1891	1892	52,000	..	..	1 *3·9-in.*, 3 *2·5-in.*, 4 *1·4-in.*	3	18·8 *t*	130	69
to. g. b.	**Lévrier**	497	197	23	10½	2240 B.	Lorient	1891	1892	52,000	..	..	1 *3·9-in.*, 3 *2·5-in.*, 4 *1·4-in.*	3	18·5 *t*	130	69
3rd cl. *cr.*	**Linois**	2308	321½	34½	17½	6600	La Seyne	1894	1895	163,014	1½	3·9 shield	4 *5·5-in.*, 2 *3·9-in.*, 8 *1·8-in.*, 4 *1·4-in.*, 4 M.	4	20·5 *t*	200	248
3rd cl. *cr.*	**Pascal**	3951	326	42¼	21½	9000 *t* B.	Toulon	1895	1897	322,321	1½	..	4 *6·4-in.*, 10 *3·9-in.*, 8 *1·8-in.*, 4 *1·4-in.*, M.	2	20·0 *t*	650	378
3rd cl. *cr.*	**Protet** . shd	4001	331¾	44¾	21	9300	Bordeaux	1898	1900	324,992	2½	2 shield	4 *6·4-in.*, 10 *3·9-in.*, 10 *1·8-in.*, 2 *1·4-in.*	2	20·2 *t*	563	384
to. g. b.	**Sainte Barbe**	430	196¾	21½	6	2000	Rouen	1885	1886	43,233	1½	..	4 *1·8-in.*, 3 M.	2	18·0	100	63
to. g. b.	**Salve**	406	196¾	21½	6	2000	Rouen	1886	1887	42,538	1½	..	4 *1·8-in.*, 3 M.	2	18·0	100	63
2nd cl. *cr.*	**Sfax**	4561	288¾	49¼	24¾	6522	Brest	1884 1898	1886	200,000	1½	..	6 *6·4-in.*, 10 *5·5-in.*, 6 *1·8-in.*, 6 *1·4-in.*, 4 M.	2	16·84 *t*	715	473
3rd cl. *cr.*	**Suchet**	3362	318¼	43½	17½	9000	Toulon	1893	1895	226,360	3	..	4 *6·4-in.*, 4 *3·9-in.*, 4 *1·8-in.*, 8 *1·4-in.*, 6 M.	7	20·4 *t*	480	246
3rd cl. *cr.*	**Surcouf**	2012	312	30½	14	6000	Cherbourg	1888	1900	131,200	1½	..	4 *5·5-in.*, 8 other Q.F., 4 M.	5	20·5 *t*	200	190
g. v.	**Surprise**	617	184¾	24½	12¼	853 *t*	Havre	1895	1896	50,954	..	..	2 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	13·4 *t*	73	99
2nd cl. *cr.*	**Tage** . shd	7469	390	53¾	22¾	12,410	St. Nazaire	1886	1888	93,857	..	..	8 *6·4-in.*, 10 *5·5-in.*, 2 *2·5-in.*, 6 smaller, 14 M.	7	19·0	1000	400
3rd cl. *cr.*	**Troude**	1994	311½	31¼	14	6000	Bordeaux	1888	1900	33,383	1½	..	4 *5·5-in.*, 8 smaller, 4 M.	5	20·9 *t*	200	190
to. g. b.	**Vautour**	1266	216½	29¼	15½	3391	Toulon	1886	1888	87,733	1½	..	5 *3·9-in.*, 1 *2·5-in.*, 6 M.	5	17·3 *t*	150	134
to. g. b.	**Wattignies**	1272	230	29¼	15	4189	Rochefort	1891	1892	111,000	..	..	5 *3·9-in.*, 6 *1·8-in.*, 7 *1·4-in.*, M.	4	18·61 *t*	160	180
g. v.	**Zélée**	554	185½	26	10½	1000 Nic.	Rochefort	1899	1900	..	..	..	2 *3·9-in.*, 4 *2·5-in.*, 4 *1·4-in.*	..	13·0	80	75

Gun vessel Fulton (899 tons); gunboats Aspic, Capricorne, Comète, Lion, Scorpion, Vipère (468 to 497 tons). Shallow-draught gunboats Argus and Vigilante, launched at Chiswick 1900:—displacement, 122 tons; 13 knots. Transport despatch vessel Vaucluse, launched 1901.

Merchant Cruisers (Auxiliary to French Navy).

To what Company belonging.	Name.	Register Tonnage.	Length.	Beam.	Depth.	H.P. (nominal.)	Speed.	When built.
		Tons.	Feet.	Feet.	Feet.		Knots.	
Compagnie Générale Transatlantique	La Lorraine	11,869	563·1	60·0	35·9	2108	20	1900
	La Savoie	11,200	563·1	60·0	35·9	2108	20	1900
	L'Aquitaine	8810	500·0	57·3	34·0	1825	19	1890
	La Touraine	9047	520·2	56·0	34·6	1616	19	1890
	Duc de Bragance	2096	334·6	34·2	16·8	426	17½	1889
	Eugène Pereire	2078	334·6	35·1	23·9	437	17½	1888
	Général Chanzy	2299	341·2	35·7	15·5	478	17½	1891
	La Bretagne	7112	495·4	51·8	34·5	1149	17½	1886
	La Champagne	7087	493·4	51·8	34·5	1149	17½	1885
	La Gascogne	7395	495·4	52·2	34·8	1308	17½	1886
	Maréchal Bugeaud	2206	342·5	34·1	23·0	482	17½	1890
	Ville d'Alger	2211	342·7	36·1	23·0	208	17½	1890
	La Navarre	6648	471·0	50·5	36·4	983	17	1892
	La Normandie	6283	459·3	49·2	34·1	1147	16	1882
	Ville de Tunis	1966	317·3	34·6	16·8	444	15½	1884
	Moïse	1873	310·0	33·5	16·7	443	15	1880
	St. Augustin	1854	314·0	33·8	16·5	443	15	1880
	Versailles	4336	373·7	45·3	27·0	780	..	1882
	Ville de Madrid	1874	308·7	33·5	16·7	370	15	1880
	Ville de Naples	1879	311·6	34·1	16·7	506	15	1881
Messageries Maritimes	Armand Béhic	6635	486·6	50·1	36·8	821	17½	1892
	Australien	6570	482·3	49·2	34·1	818	17½	1889
	Polynésien	6569	482·3	49·2	34·1	818	17½	1890
	Ville de la Ciotat	6631	485·8	49·9	36·8	819	17½	1892
	Annam	6344	446·2	50·9	36·1	832	17½	1898
	Atlantique	6708	468·9	50·6	32·8	832	17½	1899
	Tonkin	6364	446·2	50·9	36·1	832	17½	1898
	Ernest Simons	4562	442·9	47·1	36·7	727	..	1893
	Indus	6357	446·2	50·8	36·1	417	..	1897
	Brésil	5876	463·9	46·4	32·5	743	16½	1889
	Chili	6375	462·6	47·6	36·7	719	..	1894
	Cordillère	6379	462·6	47·6	36·1	721	..	1895
	La Plata	5807	462·6	45·9	32·5	520	16½	1889

NOTE.—The armament for the larger ships is 7 5·5-in. and smaller quick-firers.

GERMANY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c. d. s.	Aegir	4084	267	49¼	17¾	4800 T.	Kiel (Danzig)	1895 1903	1897	233,500	9½ H.S.	2	..	..	8¾ H.S.	..	3 9·4-in., 10 3·4-in., 6 M.	3 (1 sub.)	14·8 t	225 †	276
b.	Baden	7252	321½	60	15½	6200 Dürr.	Kiel	1880 1897	1884	444,886	16	2¾	10	..	10	..	6 10·2-in., 8 3·4-in., 8 1·4-in., 1 l., 6 M.	5 (2 sub.)	14·0	700	376
a. g. b.	Basilisk	1901	154¼	36	10¼	759	Bremen	1878	1879	58,042	8	2	..	..	8	..	1 12-in., 2 3·3-in., 2 M.	2	9·0	40	76
b.	Bayern	7252	321½	60	19½	6326 Dürr.	Kiel	1878 1896	1882	406,660	16	3	10	..	10	..	6 10·2-in., 8 3·4-in., 8 1·4-in., 1 l., 6 M.	5 (2 sub.)	14·0	700	376
c. d. s.	Beowulf	4049	267	49¼	17¾	4800 T.S.	Bremen	1890 1902	1893	175,000	9½	1¼	..	..	8	..	3 9·4-in., 10 3·4-in., 7 M.	4	15·0	580	297
b.	Brandenburg	9874	354¼	65	24½	9640	Stettin (Vulcan)	1891	1893	606,500‖	15¾ comp.	2½	..	..	11¾ comp.	1½	6 11-in., 8 4·1-in., 8 3·4-in., 12 1·4-in., 8 M., 2 l.	6	16·5 t	† 680	552
t.	Braunschweig	12,997	398½	73½	24½	16,000 T. S. & C.	Germania	1902	1904	1,157,500	9–4 K. S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 11-in., 14 6·7-in., 12 3·4-in., 12 1·4-in., 8 M.	6 (sub.)	18·0	800 700 1600§	660
a. g. b.	Biene	1091	154¼	36	10¼	759	Bremen	1876	1877	62,853											
a. g. b.	Camäleon	1091	154¼	36	10¼	759	Bremen	1878	1880	57,564	8	2	..	..	8	..	1 12-in., 2 3·3-in., 2 M.	2	10·0	40	76
a. g. b.	Crocodil	1091	154¼	36	10¼	759	Bremen	1879	1880	57,237											
a. c.	C.	11,319	449½	..	..	26,000	Bremen (Weser)	Bldg.	..	..	..	..	..	..	..	..	.. ..	..	22·5	..	..
a. c.	D. ‡						..	Pro.	..												
t.	Deutschland (ex N.)						Germania	1904	..	..											
t.	O.						Stettin (Vulcan)	Bldg.	..	..											
t.	P.	12,997	398½	72¾	24½	16,000 T.S. & C.	Wilhelmshav'n	Bldg.	..	..	9½–4 K.S.	3	8 K.S.	6 K.S.	10–6 K.S.	6½ K.S.	4 11-in., 14 6·7-in., 22 3·4-in., 4 1·4-in., 4 M.	6 (sub.)	18·0	700 1800§	736
t.	Q. ‡						Schichau	Pro.	..	..											
t.	R. ‡						Germania	Pro.	..	..											
t.	Elsass	12,997	398½	72¾	24½	16,000 W.T. & C.	Danzig (Schichau)	1903	..	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 11-in., 14 6·7-in., 12 3·4-in., 12 1·4-in., 8 M.	6 (5 sub.)	18·0	800 1600§	660
a. c.	Friedrich Karl	8858	393½	65½	24	18,500 Dürr.	Hamburg	1902	1904	875,000	4 K.S.	2	6 K.S.	4 K.S.	6 K.S.	4 K.S.	4 8·2-in., 10 5·9-in., 12 3·4-in., 10 1·4-in., 4 M.	6 (3 sub.)	20·5 t	950 1500§	504

† Also liquid fuel. ‡ Estimates, 1905.—O. and P. water-tube boilers only. § And 200 tons "tar oil." ‖ Exclusive of armament.

GERMANY.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side abve Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
c. d. s.	Frithjof	4049	267	49¼	17¾	4800 T. S.	Bremen	1891	1892	175,000	9½ H. S.	1¼	..	..	7¾ H. S.	4 K.S.	3 *9·4-in.*, 8 *3·4-in.*, 6 M.	4	14·8	225	276
a. c.	Fürst Bismarck	10,570	393½	66½	26	14,000 Dürr.	Kiel	1897	1900	..	7¾ K. S.	3	..	..	7¾ K. S.	..	4 *9·4-in.*, 12 *5·9-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 8 M.	6 (5 sub.)	19·0	1000§	565
c. d. s.	Hagen	4049	267	49¼	17¾	5250 T.	Kiel	1893 1900	1895	..											
c. d. s.	Heimdall	4049	267	49¼	17¾	4393 T. S.	Wilhelmshaven	1892 1902	1893	233,500	7 K. S. (Hagen and Heimdall)	1¼	..	..	7¾ H. S.	..	3 *9·4-in.*, 10 *3·4-in.*, 7 M.	4	15·0	580§	297
t.	Hessen	12,997	398½	73¾	24½	16,000 W.T.&C	Kiel (Germania)	1903	..	1,157,500	9–4 K. S.	3	6 K.S.	6 K.S.	10–6 K. S.	6 K S.	4 *11-in.*, 14 *6·7-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (5 sub.)	18·0	800 / 1600§	660
c. d. s.	Hildebrand	4049	267	49¼	17¾	4413 T. S	Kiel	1892	1893	218,000	7 K. S.	1¼	..	..	7¾ H. S.	..	3 *9·4-in.*, 10 *3·4-in.*, 7 M.	4	15·0	580§	297
a. g. b.	Hummel	1091	143	36	10½	759	Bremen	1881	1881	56,741	8	2	..	..	8	..	1 *12-in.*, 2 *3·3-in.*, 2 M.	2	10·0	40	76
t.	Kaiser Barbarossa					13,000 C.&T.	Danzig	1900	1901												
t.	Kaiser Friedrich III.					13,000 C.&T.	Wilhelmshaven	1896	1898												
t.	Kaiser Wilhelm II.†	10,976	377¼	66¾	25½	13,000 C. T. & S.	Wilhelmshaven	1897	1900	962,500	11¾ H. N. S.	3	..	..	9¾ H. N. S.	6 H.N.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·3-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	18·0	650 / 1000§	700
t.	Kaiser Wilhelm der Grosse					13,000 C. & T. S.	Germania	1899	1901												
t.	Kaiser Karl der Grosse					13,000 C. & T. S.	Hamburg (Blohm & Voss)	1899	1901												
b.	Kurfürst Friedrich Wilhelm.	9874	354¼	65	24½	9959	Wilhelmshaven	1891	1893	653,000‡	15¾ *comp.*	2½	..	..	11¾ *comp.*	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 12 *1·4-in.*, 8 M., 2 l.	6 (sub.)	16·0	680 / 800	550
t.	Lothringen (ex M.)	12,997	398½	73¾	24½	16,000 W.T.&C	Schichau (Danzig)	1904	..	1,157,500	9–4 K. S.	3	6 K. S.	6 K.S.	10–6 K. S.	6 K. S.	4 *11-in.*, 14 *6·7-in.*, 12 *3·4-in.*, 12 *1·4-in.*, 8 M.	6 (5 sub.)	18·0	800 / 1600§	600
t.	Mecklenburg (F)	11,613	393¾	68¼	24¾	14,000 C. T. & S.	Stettin (Vulcan)	1901	1903	1,061,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·3-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	18·1 *t*	700 / 1450§	715
a. g. b.	Mücke	1091	154¼	36	10¼	759	Bremen	1877	1878	60,960											
a. g. b.	Natter	1091	154	36	10¼	759	Bremen	1880	1881	52,822	8 (Mücke and Natter)	2	..	..	8	..	1 *12-in.*, 2 *3·3-in.*, 2 M.	2	10·0	40	76
c. d. s. b.	Odin	4084	267	49¼	17¾	4800 T.S.	Danzig	1894	1896	..	9½ H. S.	2	..	..	8¾ H. S.	..	3 *9·4-in.*, 10 *3·4-in.*, 6 M.	3 (1sub.)	15·0	225§	266
b.	Oldenburg	5140	246	59	19½	3900	Stettin	1884	1887	235,342	12 *comp.*	1	..	..	8 *comp.*	..	8 *9·4-in.*, 2 *3·4-in.*, 6 M.	4	13·5 *t*	475	356
t.	Preussen	12,997	389½	73¾	24½	16,000 W.T.& C.	Stettin	1903	..	1,157,500	9–4 K.S.	3	6 K.S.	6 K.S.	10–6 K.S.	6 K.S.	4 *11-in.*, 14 *16·7-in.*, 12 *3·4-in.*, 12 *1·4-in.* & 8 M.	6 (5sub.)	18·0	800 / 1600§	660
a. c.	Prinz Adalbert	8858	393½	65½	24	18,500 Dürr.	Kiel	1901	1903	885,000	4 K.S.	1½	3 K.S.	3 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, 10 *5·9-in.*, 12 *3·4-in.*, 10 *1·4-in.*, 4 M	4 (3sub.)	20·0	950 / 1500§	504
a. c.	Prinz Heinrich	8759	396	64¼	25¼	15,000 Durr.	Kiel	1900	1902	730,000	4 K.S.	2½	4 K.S.	..	6 K.S.	4 K.S.	2 *9·4-in.*, 10 *5·9-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 4 M.	4 (3sub.)	20·0	950	528
a. c.	Roon	9350	403¾	65½	24	19,000 Dürr.	Kiel	1903	..	875,000	4–3 K.S.	2¾	6 K S.	4 K.S.	6 K S.	4 K.S.	4 *8·2-in.*, 10 *5·9-in.*, 12 *3·4-in.*, 10 *1·4-in.*, 4 M.	4 (sub)	21·0	750 / 1800§	·50
b.	Sachsen	7252	321½	59	21	6000 Dürr.	Stettin	1877 1896	1878	422,178	15¾	3	10	..	15¾	..	6 *10·2-in.*, 8 *3·4-in.*, 8 *1·4-in.*, 1 l., 6 M.	5 (2sub.)	14·0	700	376
t.	Schwaben (G)	11,613	393¾	68¼	24¾	14,000 C.&T.S.	Wilhelmshaven	1901	1903	1,061,250	9-4 K S.	3	5½ K.S.	6 K.S.	10–6 K.S.	6 K S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·3-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	18·0	700 / 1450§	715
c. d. s.	Siegfried	4049	267	49¼	17¾	4800 T. S.	Germania	1889	1890	175,000	9½	1¼	..	..	7¾	..	3 *9·4-in.*, 6 *3·4-in.*, 6 M.	4	14·8 *t*	225§	276
a. g. b.	Salamander	1091	154¼	36	10¼	759	Bremen	1880	1881	56,914											
a. g. b.	Skorpion	1091	154¼	36	10¼	759	Bremen	1877	1877	60,796	8 (Salamander, Skorpion, Viper, Wespe)	2	..	..	8	..	1 *12-in.*, 2 *3·3-in.*, 2 M.	2	10·0	40	76
a. g. b.	Viper	1091	154¼	36	10¼	759	Bremen	1876	1877	61,463											
a. g. b.	Wespe	1091	154¼	36	10¼	759	Bremen	1876	1878	53,771											
b.	Weissenburg	9874	354¼	65	24¾	9000	Stettin (Vulcan)	1891	1893	659,475‡	15¾	2½	..	..	11¾	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 12 *1·4-in.*, 8 M., 2 l.	6 (sub.)	16·0	680 / 800	552
t.	Wettin	11,613 (Wettin and Wittelsbach)	393¾	68¼	24¾	14,000 C.&T.S.	Schichau	1901	1902	1,071,250	9–4 K.S. (Wettin and Wittelsbach)	3	5½ K.S.	6 K.S.	10 K.S.	6 K S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·3-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	18·0	700 / 1450§	715
t.	Wittelsbach						Wilhelmshaven	1900	1902	1,071,250											
b.	Wörth	9874	354¼	65	24½	10,224 (*t*)	Kiel	1892	1894	595,250‡	15¾	2½	..	..	11¾	1½	6 *11-in.*, 8 *4·1-in.*, 8 *3·4-in.*, 12 *1·4-in.*, 8 M., 2 l.	6 (sub.)	17·2	680 / 800	552
b.	Württemberg	7252	321½	60	19½	6000 T. S.	Stettin	1878 1898	1881	402,512	15¾	3	10	..	10	..	6 *10·2-in.*, 8 *3·4-in.*, 8 *1·4-in.*, 1 l., 6 M.	5 (2sub.)	14·0	700	376
a. c.	Yorck	9350	403¾	65½	24	19,000 Dürr.	Hamburg	1904	..	875,000	4–3 K.S.	2	6 K.S.	4 K.S.	6 K.S.	4 K.S.	4 *8·2-in.*, 10 *5·9-in.*, 12 *3·4-in.*, 10 *1·4-in.*, 4 M.	4 (sub.)	21·0	750 / 1600†	550
t.	Zähringen	11,613	393¾	68½	24¾	15,000 C.&T.S.	Germania	1901	1902	1,071,250	9–4 K.S.	3	5½ K.S.	6 K.S.	10 K.S.	6 K.S.	4 *9·4-in.*, 18 *5·9-in.*, 12 *3·3-in.*, 12 *1·4-in.*, 8 M.	6 (5sub.)	19·0	650 / 1000§	715

The old ironclads Friedrich der Grosse, Saturn (ex Preussen), Jupiter (ex Deutschland), Kaiser and König Wilhelm are used for harbour service.

† Kaiser Wilhelm II. specially fitted as fleet flagship to receive the Emperor, with a staff of 64.

‡ Exclusive of armament.

§ Also liquid fuel.

GERMANY.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
3rd cl. cr.	Alexandrine (Ersatz)	3200	341	43½	16½	10,000 T.S.	Danzig	Bldg.	..	254,500	2	..	10 4·1-in., 10 1·4-in., 4 M., 2 l.	2 (sub.)	22·0	800	..
,, ,,	Amazone . shd.	2618	328	38½	16	8000 T.S.	Kiel (Germania)	1900	1901	247,000	2	..	10 4·1-in., 14 1·4-in., 4 M., 2 l.	2 (sub.)	21·5 t	560	249
,, ,,	Arcona . shd.	2657	328	38½	16	8000 T.S.	Bremen (Weser)	1902	..	254,500	2	..	10 4·1-in., 12 1·4-in., 4 M., 2 l.	2 (sub.)	21·0	700	249
,, ,,	Ariadne . shd.	2618	328	38½	16	8000 T.S.	Bremen (Weser)	1900	1901	247,000	2	..	10 4·1-in., 14 1·4-in., 4 M., 2 l.	2 (sub.)	22·0	560	249
,, ,,	Berlin . shd.	3200	341	43½	16½	11,000 T.S.	Danzig	1903	1904	254,500	2	..	10 4·1-in., 10 1·4-in., 4 M., 2 l.	2 (sub.)	23·0	800	..
,, ,,	Blitz	1360	246	32¾	13½	2839	Kiel	1882	1883	66,935	..	..	6 3·4-in., 4 M.	1	16·0	180	135
,, ,,	Bremen	3200	341	43½	16½	10,000 T.S.	Bremen (Weser)	1903	1904	254,500	2	..	10 4·1-in., 10 1·4-in., 4 M., 2 l.	2 (sub.)	23·0	800	..
,, ,,	Bussard	1555	256	30¼	18¼	2900	Danzig	1890	1890	..	3	..	8 4·1-in., 7 M.	2	16·5 t	300	165
to. g. b.	Comet	971	262½	31¼	13¾	5000	Stettin	1892	1896	..	2	..	4 3·4-in., 2 M.	1	21·0 t	120	115
3rd cl. cr.	Condor	1614	246	33½	15	2930	Hamburg	1892	1892	..	3	..	8 4·1-in., 7 M.	2	16·5 t	300	165
3rd cl. cr.	Cormoran	1614	246	33½	15	2930	Danzig	1892	1893	..	3	..	8 4·1-in., 7 M.	2	16·0	300	165
g.b.	Eber	977	206¾	30¼	10¾	1300 T.S.	Danzig	1903	..	91,000	..	..	8 3·4-in., 6 1·4-in., 2 M.	..	13·0	240	121
3rd cl. cr.	Falke	1555	246	33½	15	2900	Kiel	1891	1902	..	3	..	8 4·1-in., 7 M.	2	15·5 t	300	165
3rd cl. cr.	Frauenlob . shd.	2657	328	38½	16	8000 T.S.	Bremen (Weser)	1902	..	254,500	2	..	10 4·1-in., 12 1·4-in., 4 M., 2 l.	2 (sub.)	21·0	700	249
2nd cl. cr.	Freya	5569	344½	57	20¾	10,000 Nic.	Danzig	1897	1898	..	4 N.S.	4 N.S.	2 8·2-in., 8 6-in., 10 3·4-in., 10 1·4-in., 4 M.	3 (sub.)	19·5 t	825	465
3rd cl. cr.	Gazelle . shd.	2603	328	38½	16¾	6400 Nic.	Kiel (Germania)	1898	1898	225,000	2	..	10 4·1-in., 14 1·4-in., 4 M., 2 l.	3 (1sub.)	18·0	560	210
2nd cl. cr.	Gefion	3705	344½	42¾	20¾	9000	Danzig (Schichau)	1893	1894	..	1½	..	10 4·1-in., 6 2·1-in., 1 l., 8 M.	2	19·0	780	302
3rd ,,	Geier . shd.	1597	249½	34¾	15½	2960	Wilhelmshaven	1894	1896	..	3	..	8 4·1-in., 7 M.	2	16·2 t	300	165
3rd cl. cr.	Greif	1971	318	32	14¾	5400	Kiel	1886	1887	..	..	..	2 3·4-in., 4 M.	..	19·0	350	170
g. v.	Habicht	848	174	29½	11½	600	Elbing	1879	1880	33,054	..	..	5 4·9-in., 5 M.	..	12·0	100	130
3rd cl. cr.	Hamburg . shd	3200	341	43½	16½	11,000 T.S.	Stettin (Vulcan)	1903	1904	254,500	2	..	10 4·1-in., 10 1·4-in., 4 M., 2 l.	2 (sub.)	23·28 t	800	249
2nd cl. cr.	Hansa . shd.	5791	345½	57¾	21¾	10,000 B.	Stettin (Vulcan)	1898	1899	..	4 N.S.	4 N.S.	2 8·2-in., 8 6-in., 10 3·4-in., 10 1·4-in., 4 M.	3 (sub.)	19·5	825	465
d.v.	Hela	2004	328	36	14¾	5860	Bremen	1895	1896	..	1½	..	4 3·4-in., 6 1·9-in., 2 M.	3	20·0	500	178
2nd cl. cr.	Hertha	5569	344½	57	21¾	10,000 B.	Stettin (Vulcan)	1897	1898	..	4 N.S.	4	2 8·2-in., 8 6-in., 10 3·4-in., 10 1·4-in., 4 M.	3 (sub.)	19·5 t	825	465
g. b.	Iltis . shd.	881	203½	29¾	10¾	1300 T	Danzig (Schichau)	1898	1898	100,000	..	..	8 3·4-in., 6 1·4-in., 2 M.	..	13·5 t	165	121
3rd cl. cr.	Irene † . shd.	4224	308	46	21	8000	Stettin	1887	1888	220,000	3	..	4 5·9-in., 8 4·1-in., 6 1·9-in., 1 l., 8 M.	4	19·8 t	540	365
to. g. b.	Jagd	1230	275½	31½	13¾	4000	Bremen	1888	1889	..	2	..	4 3·4-in., 2 M.	3	20·0	230	141
g. b.	Jaguar . shd.	900	203½	29¾	10¾	1300 T.	Danzig (Schichau)	1898	1899	90,000	..	..	8 3·4-in., 6 1·4-in., 2 M.	..	13·5 t	165	121
2nd cl. cr.	Kaiserin Augusta† shd.	5760	387	52½	23	14,000	Kiel (Germania)	1892	1896	..	3½	..	12 5·9-in., 8 3·4-in., 2 l., 8 M.	5	21·0	850	436
3rd cl. cr.	Lübeck	3200	341	43½	16½	10,000 Turbine	Stettin (Vulcan)	1904	..	254,500	2	..	10 4-in., 10 1·4-in., 4 M., 2 l.	2 (sub.)	22·0	800	..
g. b.	Luchs	962	206¾	30¼	10¾	1300 T.S.	Danzig	1899	1900	91,000	..	..	8 3·4-in., 6 1·4-in., 2 M.	..	13·5 t	240	121
3rd cl. cr.	Medusa . shd.	2618	328	38½	16	8000 T.S.	Bremen (Weser)	1900	1901	247,000	2	..	10 4·1-in., 14 1·4-in., 4 M., 2 l.	2 (sub.)	22·0	560	249
,, ,,	Meteor (Ersatz)	3200	341	43½	16½	11,000 T.S.	Kiel	Bldg.	..	254,500	2	..	10 4·1-in., 10 1·4-in., 4 M., 2 l.	2 (sub.)	23·0	800	..
,, ,,	München . shd.	3200	341	43½	16½	11,000 T.S.	Bremen (Weser)	1904	..	254,500	..	..	10 4-in., 10 1·4-in., 4 M., 2 l.	2 (sub.)	23·0	800	..
,, ,,	Leipzig, ex-N.	3200	341	43½	16½	11,000	Bremen (Weser)	Bldg.	..	254,500	2	..	10 4·1-in., 10 1·4-in., 4 M., 2 l	2 (sub.)	23·0	800	..
,, ,,	Niobe . shd.	2603	328	38½	15	8000 T.S.	Bremen (Weser)	1899	1901	217,500	} 2	..	10 4·1-in., 14 1·4-in., 4 M., 2 l.	2 (1sub.)	20·0	560	250
,, ,,	Nymphe . shd.	2618	328	38½	15	8000 T.S.	Kiel (Germania)	1899	1901	217,500							
,, ,,	O.*	} ..	..	..	..	..	..	Pro.									
,, ,,	Wacht (Ersatz)						..										
,, ,,	Blitz (Ersatz)*						..										

* Estimates of 1905. The gun-vessel C, 977 tons, is in hand.

† Being partially reconstructed.

GERMANY.—Cruising Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			kts.	tons.	
g. b.	Panther	962	206¾	30¼	10¾	1300 T.S.	Danzig	1901	1902	91,000	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	240	121
cr.	Pelikan (mining ship)	2215	259	38	14½	3000	Kiel	1890	1891	..	..	..	4 *3·4-in.*, 4 M.	..	15·4 *t*	370	183
3rd cl. *cr*	Pfeil	1360	246	32¾	13½	2700	Wilhelmshaven	1882	1883	73,605	..	..	4 *3·4-in.*, 4 M.	1	16·0	180	135
" "	Prinzess Wilhelm shd.	4224	339½	46	21	8000	Gaarden	1887	1888	220,000	3	..	4 *5·9-in.*, 8 *4·1-in.*, 6 *1·9-in.*, 1 l., 8 M.	4	18·7 *t*	510	365
g. v.	Schwalbe	1102	203	30½	12¼	1500	Wilhelmshaven	1887	1887	..	3	..	8 *4·1-in.*, 7 M.	..	13·5 *t*	264	117
3rd cl. *cr.*	Seeadler	1614	246	33½	15	2800	Hamburg	1892	1892	..	3	..	8 *4·1-in.*, 7 M.	2	16·0	300	165
g. v.	Sperber	1102	236	29¾	12½	1500	Wilhelmshaven	1888	1889	..	3	..	8 *4·1-in.*, 6 M.	..	13·5 *t*	264	117
3rd cl. *cr.*	Thetis. shd.	2618	344½	38½	16	8000 T.S.	Danzig	1900	1901	247,000	2	..	10 *4·1-in.*, 14 *1·4-in.*, 4 M., 2 l.	2 (sub.)	21·8 *t*	560	249
g. b.	Tiger	962	203½	29¾	10	1300 T.S.	Danzig	1899	1900	..	..	..	8 *3·4-in.*, 6 *1·4-in.*, 2 M.	..	13·5 *t*	240	121
3rd cl. *cr.*	Undine shd.	2657	328	38½	15	8000 T.S.	Kiel (Howaldt)	1902	..	254,500	2	..	10 *4·1-in.*, 12 *1·4-in.*, 4 M., 2 l.	2 (sub.)	21·0	700	249
2nd cl. *cr.*	Victoria Luise	5569	344½	57	21¾	10,000 Dürr.	Bremen	1897	1898	..	4 H.S.	4 H.S.	2 *8·2-in.*, 8 *6-in.*, 10 *3·4-in.*, 10 *1·4-in.*, 4 M.	3 (sub.)	19·5 *t*	825	465
" "	Vineta shd	5791	345½	57¾	21¾	10,000 Dürr.	Danzig	1897	1899	..	4 H.S.	4 H.S.	2 *8·2-in.*, 8 *6-in.*, 10 *3·4-in.*, 10 *1·4-in*, 4 M.	3 (sub.)	19·5 *t*	825	465

The Sophie, Charlotte, Marie, Mars, Grille, Hay, Ulan, Brummer, Nixe, Olga, Rhein, Moltke, Stein, and Stosch are used as schoolships. The Blücher (2856 tons), is the torpedo training ship, and the Carola (2169 tons), the gunnery ship.

The Imperial Yacht Hohenzollern, 4187 tons, 9460 I.H.P., 22 knots, carries 8 1·9-in. Q.F., but provision is made for mounting 3 4·1-in., 12 1·9-in. Q.F. and 4 M.

The station vessel for Constantinople is named the Loreley. River gunboats for China, the Tsingtau, Vaterland and Vorwärtz (168 tons).

Merchant Cruisers (Auxiliaries to the German Navy).

To what Company belonging.	Name of Ship.	Register Tonnage.	Length.	Beam.	Draught of Water.	Indicated H.P.	Ocean Speed.	When Built.	Armament of each Ship.
		tons.	ft. in.	ft. in.	ft. in.		knots.		
North German Lloyd	Kronprinz Wilhelm .	14,800	640 0	66 0	26 3	30,000	23	1901	The armament is of 6-in. and smaller quick-firers.
	Kaiser Wilhelm der Grosse	14,349	625 0	66 0	27 0	28,000	23	1897	
	Kaiser Wilhelm II . .	19,500	678 0	72 0	..	44,000	24	1902	
	Aller	5217	436 6	48 0	..	1300(a)	16	1885	
	Trave	5262	436 6	48 0	..	1300(a)	16	1886	

(a) Nominal horse-power.

GREECE.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Belt.	Armour: Deck.	Armour: Side above Belt.	Armour: Bulkhead.	Armour: Gun Position: Heavy Guns.	Armour: Gun Position: Second-ary.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Coal.	Complement.
		ons.	ft.	ft.	ft.						in.	in.	in.	in.	in.	in.			knots.	tons.	
b.	Hydra . .	4808	334½	51¾	23¼	7000	St. Nazaire La Seyne .	1889 1900	1891	..	11¾-4	2½	3	..	13½	..					
”	Psara . . .	4808	334½	51¾	23¼	7000	Havre . La Seyne .	1890 1897	1892	..	11¾-4	2½	3	..	13½	..	3 *10·6-in.* Canet, 5 *5·9-in.*, 1 *3·9-in.*, 8 *2·5-in.*. 4 *1·8-in.*, 12 *1·4-in.*	3	17·0	600	400
”	Spetsai . .	4808	334½	51¾	23¼	7000	Havre . La Seyne .	1889 1900	1891	..	11¾-4	2½	3	..	13½	..					

GREECE.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Deck.	Armour: Gun Position.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.			knots.	tons.	
g.v.	Acheloos . . .	420	130	24½	11½	400	Blackwall .	1884	1885	..	..	..	2 *3·7-in.* (K.), 3 M.. .	..	10·0	50	..
”	Alphios . . .	420	130	24½	11½	400	Blackwall .	1884	1885	..	..	..	2 *3·7-in.* (K.), 3 M.. .	..	10·0	50	..
”	Eurotas . . .	420	130	24½	11½	400	Dumbarton .	1884	1885	..	..	..	2 *3·7-in.* (K.), 3 M.. .	..	10·0	50	..
corv.	Sfaktirea . . .	1000	216½	29¼	18	2400	England . .	1885	1886	..	..	..	2 *3·9-in.* (K.), 2 M.. .	..	14·5	100	..

Torpedo depôt-ship.—Kanaris, 1100 tons, 500 I.H.P., 2 3·9-in. (Krupp) guns, 2 Whitehead torpedo-launching guns on broadside, 2 under-water torpedo tubes ahead; 14 knots speed. Gunboats, Ambrakia and Aktion, of 440 tons displacement, 380 horse-power, 10 knots speed, fitted with 1 10·2-in. Krupp gun and 2 machine guns; launched 1885; 4 gunboats, A. β. Γ. Δ. (52 tons, 1 4·7-in. Krupp), launched 1881; and 3 mining vessels (300 tons), launched 1881.

ITALY.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour: Belt.	Armour: Deck.	Armour: Side above Belt.	Armour: Bulkhead.	Armour: Gun Position: Heavy Guns.	Armour: Gun Position: Secondary.	Armament: Guns.	Armament: Torpedo Tubes.	Speed.	Coal.	Comp'ement.
		tons.	ft.	ft.	ft.					£	in.	ins.	ins.	ins.	ins.	ins.			knots.	tons	
a.c. / ,,	A. / B.	9842	436	69	23½	18,000	Castellamare	Bldg. / Prop.		880,000	8	..	..	..	7-6	..	4 10-in., 8 8-in., 16 3-in., 8 1·8in.	2	22·5	700 / 1500	
t.	Affondatore	3851	290	40	20	3240	Millwall	1865	1868	197,600	5 iron.	2	..	..	5 iron.	..	2 28-ton (A.), 6 4·7-in., 2 2·9-in., 4 2·2-in., 4 1·4-in., 2 M.	2	12·0	460	303
,,	Ammiraglio di St. Bon	9645	344½	69¼	24¾	13,500	Venice	1897	1901	..	9¾–4 H.S.	3–1½	6 H.S.	6 H.S.	9¾ H.S.	6 H.S.	4 10-in., 8 6-in., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	4	18·3 t	600	548
b.	Andrea Doria	11,027	328¼	65¼	27¼	10,500	Spezia	1885	1889	765,500	18 comp.	3	18 comp.	14 comp.	18 comp.	..	4 105-ton (A.), 2 6-in., 4 4·7-in., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2sub.)	16·1 t	850	526
,,	Benedetto Brin	13,214	426½	78¼	27¼	19,000 B.	Castellamare	1901	1904	..	6–2 H.S.	3	6 H.S.	8 H.S.	10 H.S.	6 H.S.	4 12-in., 4 8-in., 12 6-in., 16 3-in., 8 1·8-in., 4 M.	4 (sub.)	19·5 t	1000 / 2000	719
a.c.	Carlo Alberto	6396	325	59	23	13,220 t	Spezia	1896	1898	..	6–4½ H.S.	1½	6 H.S.	..	6 H.S.	4½ shields	12 6-in., 6 4·7-in., 2 2·9-in., 10 2·2-in., 10 1·4-in., 2 M.	4	19·2 t	1000	500
t.	Dandolo *	12,071	341	64¾	26½	8045	Spezia	1878 1898	1881	872,640	21½	2	17	16	10 H.S.	2 screens	4 10-in. (A.), 7 6-in., 5 4·7-in., 2 2·9-in., 10 2·2-in., 14 1·4-in., 2 M.	4	15·6 t	732	506
,,	Duilio	10,962	341	64¾	26½	7710	Castellamare	1876	1880	850,400	21½	2	17	16	18	..	4 100-ton M.L.R. (A.), 3 4·7-in., 2 2·9-in., 8 2·2-in., 22 1·4-in., 2 M.	3	15·0	1000	487
,,	Emanuele Filiberto	9645	344½	69¼	24¾	,500	Castellamare	1897	1902	..	9¾–4 H.S.	3–1	6 H.S.	6 H.S.	9¾ H.S.	6 H.S.	4 10-in., 8 6-in., 8 4·7-in., 2 2·9-in., 8 2·2-in., 12 1·4-in., 2 M.	4	18·3 t	600	536
b.	Francesco Morosini	11,145	328¼	65¼	27¼	9560	Venice	1885	1889	770,680	18 comp.	3	18 comp.	14 comp.	18 comp.	..	4 105-ton (A.), 2 6-in., 4 4·7-in., 2 2·9-in., 10 2·2-in., 17 1·4-in., 2 M.	5 (2sub.)	17·0	850	509
a.c. / ,,	Francesco Ferruccio / Giuseppe Garibaldi	7294	344	59¾	23¼	13,500 Nic. / 14,713 t Nic.	Venice / Sestri-Ponente (Ansaldo)	1902 / 1899	1904 / 1901	..	6–3 H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	1 10-in., 2 8-in., 14 6-in., 10 2·9-in., 6 1·8-in., 2 M.	4 (sub.)	20·0	655 / 1200	540
b.	Italia	15,407	400½	74	31¼	11,986 t	Castellamare	1880	1884	1,167,680	16 funnel op'nings	3	..	..	19 comp.	..	4 100-ton (A.), 8 6-in., 4 4·7-in., 12 2·2-in., 24 1·4-in., 2 M.	4	18·0 t	1200	748

* New armament given. The reconstruction of the Duilio is not likely to be proceeded with.

ITALY.—Armoured Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Complet'on.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			kts.	tons.	
b.	Lepanto	15,549	400½	74	31¼	15,800 *t*	Leghorn (Orlando)	1883	1887	1,150,880	16 funnel op'nings	3	..	..	19 *comp.*	..	4 *100-ton* (A.), 8 *6-in.*, 4 *4·7-in.*, 12 *2·2-in.*, 34 *1·4-in.*, 2 M.	4	18·38 *t*	1650	748
a.c.	Marco Polo	4511	327	48¼	19½	10,543 *t*	Castellamare	1890	1895	344,400	4	1	4	4	4	..	6 *5·9-in.*, 10 *4·7-in.*, 2 *2·9-in.*, 9 *2·2-in.*, 4 *1·4-in.*, 2 M.	5 (1sub.)	19·0 *t*	600	394
b.	Napoli	12,425	435½	73½	27¼	20,000 Nic.	Castellamare	Bldg.	..	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 12 *3-in.*, 12 *1·8-in.*	4 (2sub.)	22·0	1000 / 2000	..
	Regina Elena					20,000 B.	Spezia	1904	..												
,,	Regina Margherita	13,214	426½	78¼	27¼	20,664 Nic.	Spezia	1901	1904	..	6 H.S.	3	6 H.S.	8 H.S.	8 H.S.	6 H.S.	4 *12-in.* 4 *8-in.*, 12 *6-in.*, 16 *3-in.*, 8 *1·8-in.*, 4 M.	4 (sub.)	20·2 *t*	1000 / 2000	719
,,	Re Umberto	13,673	400	76¾	28½	19,500	Castellamare	1888	1893	1,058,500	4	3	4	2¾	18	..	4 *67-ton* (A.), 8 *6-in.*, 16 *4·7-in.*, 2 *9-in.*, 15 *2·2-in.*, 14 *1·4-in.* 2 M.	8	19·0	1200	785
,,	Roma	12,425	435½	73½	27¼	20,000 B.	Spezia	1904	..	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 12 *3-in.*, 12 *1·8-in.*	4 (2sub.)	22·0	1000 / 2000	..
,,	Ruggiero di Lauria	10,997	328¼	65¼	27¼	10,600	Castellamare	1884	1887	777,560	18 *comp.*	3	18 *comp.*	14 *comp.*	18 *comp.*	..	4 *105-ton* (A.), 2 *6-in.*, 4 *4·7-in.*, 2 *2·9-in.*, 10 *2·2-in.*, 17 *1·4-in.*, 2 M.	5 (2 sub.)	17·0	910	509
,,	Sardegna	13,640	411	76¾	28½	19,650 *t*	Spezia	1890	1895	1,057,440	4	3	4	2¾	14¼ *comp.*	..	4 *67-ton* (A.), 8 *5·9-in.*, 16 *4·7-in.*, 2 *2·9-in.*, 20 *2·2-in.*, 10 *1·4-in.*, 2 M.	5	20·1 *t*	1200	785
,,	Sicilia	13,087	400	76¾	28½	19,500	Venice	1891	1895	1,050,000	4	3	4	2¾	18 *comp.*	..	4 *67-ton* (A.), 8 *5·9-in.*, 16 *4·7-in.*, 2 *2·9-in.*, 20 *2·2-in.*, 10 *1·4-in.*, 2 M.	5	19·2 *t*	1200	785
a.c.	Varese	7294	344	59¾	23⅓	13,500 B.	Leghorn (Orlando)	1899	1900	..	6–4½ H.S.	1½	6 H.S.	5 H.S.	6 H.S.	6 H.S.	1 *10-in.*, 2 *8-in.*, 14 6-in., 10 *2·9-in.*, 6 *1·8-in.*, 2 M.	4	20·0	650 / 1200	500
b.	Vittorio Emanuele III.	12,425	435½	73½	27¼	20,000 B.	Castellamare	1904	..	1,120,000	9¾–4 H.S.	2	8 H.S.	8 H.S.	8 H.S.	6 H.S.	2 *12-in.*, 12 *8-in.*, 12 *3-in.*, 12 *1·8-in.*	2 (sub.)	22·0	1000 / 2000	..
a.c.	Vettor Pisani	6396	325	59	23	13,000	Castellamare	1895	1897	..	6 H.S.	1½	6 H.S.	..	6 H.S.	4½ shields	12 *6-in.*, 6 *4·7-in.*, 2 *2·9-in.*, 10 *2·2-in.*, 10 *1·4-in.*, 2 M.	5	20·0	600	504

ITALY.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Comp'et'on.	Cost.	Armour. Deck.	Armour. Gun Position.*	Armaments. Guns.	Armaments. Torpedo Tubes.	Speed.	Coal.	Comp'ement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
to.cr	Agordat	1292	287½	30½	11	8000	Castellamare	1899	1900	..	1	..	4 *4·7-in.*, 8 *2·2-in.*, 2 *1·4-in.*	2	22·0	160	158
d.v.	Archimede	772	230	26¼	10	1401	Venice	1887	1888	60,120	..	..	4 *4·7-in.*, 2 *2·2-in.*, 2 *1·4-in.*	2	16·0	210	109
to.g.b.	Aretusa	833	230	26¾	11¾	4420	Leghorn (Orlando)	1891	1892	72,920	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	20·7 *t*	120	111
3rd cl. *cr.*	Calabria	2428	249¼	42	16¾	4094 *t*	Spezia	1894	1897	183,120	2	..	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	16·4 *t*	500	257
to.g.b.	Calatafimi	833	229½	27	10¼	4136	Castellamare	1893	1894	72,920	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	20·0	120	111
"	Caprera	833	230	27¼	10¼	4189	Leghorn (Orlando)	1894	1895	72,920	1	..	2 *4·7-in.*, 4 *2·2-in.*, 2 *1·4-in.*	5	21·0	120	111
to.cr.	Coatit	1292	287½	30½	11	8160	Castellamare	1899	1902	..	1	..	4 *4·7-in.*, 8 *2·2-in.*, 2 *1·4-in.*	2	21·1 *t*	160	158
3rd cl. *cr.*	Cristoforo Colombo	2713	249	36	17½	2321	Venice	1892 Rebuilt	1893	157,240	..	..	6 *4·7-in.*, 2 *2·2-in.*, 4 *1·4-in.*	..	16·0	445	238
g.v.	Curtatone	1272	177¼	32¾	13½	1100	Venice	1887	1888	58,440	..	..	4 *2·2-in.*, 2 *1·4-in.*, 2 M.	..	12·0	197	131
g.b.	Cyclope	831	..	..	..	2298	Naples	1903	1903	..	..	..	..	..	15·0	..	..
3rd cl. *cr.*	Dogali	2055	250	37	14½	7600	Elswick	1887	1889	156,040	2	4½	6 *6-in.* (A.), 1 *2·9-in.*, 9 *2·2-in.*, 2 *1·4-in.*, 2 M.	4	19·66 *t*	480	257
"	Elba . shd.	2689	272½	40¾	16½	7471 *t*	Castellamare	1893	1895	200,000	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	17·9 *t*	500	272

* Shields.

ITALY.—Cruising Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
2nd cl. *cr.*	Etna	3470	282½	42½	19	6169	Castellamare	1885	1887	226,720	1½	5	2 *9·8-in.* (A.), 6 *5·9-in.*, 1 *2·9-in.*, 5 *2·2-in.*, 8 *1·4-in.*, 2 M.	4	17·8	630	315
to.g.b.	Euridice	905	229½	27	10¼	4162	Castellamare	1891	1892	72,920	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	19·8 *t*	120	111
3rd cl. *cr.*	Etruria	2245	262½	39½	16½	7585 *t*	Leghorn (Orlando)	1891	1893	183,120	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 10 *1·4-in.*, 2 M.	2	19·84 *t*	400	257
2nd cl. *cr.*	Fieramosca	3534	290	43½	19¼	7700	Leghorn (Orlando)	1888	1890	240,120	1½	5	2 *9·8-in.*, 6 *6-in.*, 1 *2·9-in.*, 5 *2·2-in.*, 8 *1·4-in.*, 2 M.	4	17·5 *t*	450	315
d.v.	Galilei	886	230	26¼	8¼	1384	Venice	1887	1888	56,720	..	..	4 *4·7-in.*, 2 *2·2-in.*, 2 *1·4-in.*	2	15·0	210	109
3rd cl. *cr.*	Giovanni Bausan	3277	275½	42½	18¼	6500	Elswick	1883	1885	179,120	1½	5	2 *9·8-in.* (A.), 6 *5·9-in.*, 1 *2·9-in.*, 4 *2·2-in.*, 8 *1·4-in.*, 2 M.	3 (1sub.)	17·5 *t*	600	295
to.g.b.	Goito	843	230	25½	11¾	2620	Castellamare	1887	1888	70,680	1	..	4 *2·2-in.*, 5 *1·4-in.*	5	19·0	130	111
g.v.	Governolo	1235	185	33¾	13¾	1100	Venice	1894	1896	58,440	..	..	4 *4·7-in.*, 4 *2·2-in.*, 2 *1·4-in.*, 2 M.	..	13·0	200	131
to.g.b.	Iride	931	229½	27	10¼	4242	Castellamare	1891	1892	72,920	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	19·6 *t*	120	111
3rd cl. *cr.*	Liguria	2245	262½	39¼	16¾	7677 *t*	Sestri (Ansaldo)	1893	1894	183,120	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 10 *1·4-in.*, 2 M.	2	19·6 *t*	430	257
" "	Lombardia	2351	262½	39½	16½	6843 *t*	Castellamare	1890	1892	183,120	2	4½	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	17·0 *t*	430	257
to.g.b.	Minerva	833	246	27½	11¾	4800 W.T.	Sestri (Ansaldo)	1892	1893	72,720	1	..	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	5	21·0	120	111
to.g.b.	Montebello	801	230	25½	11¾	2776	Spezia	1888	1899	74,120	..	1	6 *2·2-in.*, 2 *1·4-in.*	4	18·0	100	111
"	Partenope	821	246	27½	11¾	4200	Castellamare	1890	1890	71,000	..	1	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	5	19 0	100	111
3rd cl. *cr.*	Piemonte	2597	300	38	15	12,000	Elswick	1888	1890	220,000	3	3	6 *6·6-in.*, 6 *4·7-in.*, 10 *2·2-in.*, 6 *1·4-in.*, 4 M.	3	21·0	560	325
" "	Puglia	2498	269	41	16¾	7000	Taranto	1898	1900	200,000	4½	1	4 *5·9-in.*, 6 *4·7-in.*, 1 *2·9-in.*, 8 *2·2-in.*, 8 *1·4-in.*, 2 M.	2	20·0	650	257
d.v.	Rapido	1568	262½	30½	12½	1450	Leghorn (Orlando)	1876	1877	77,400	..	..	5 *2·2-in.*, 2 M.	1	13·4 *t*	300	135
to.g.b.	Saetta	395	187	19¾	6½	2400	Castellamare	1887	1888	38,880	..	..	2 *2·2-in.*, 4 *1·4-in.*	3	20·0	90	70
2nd cl. *cr.*	Stromboli	3836	282½	42½	19	6298	Venice	1886	1888	220,080	5	1·5	2 *9·8-in.* (A.), 6 *5·9-in.*, 1 *2·9-in.*, 5 *2·2-in.*, 8 *1·4-in.*, 2 M.	4	17·0	600	315
to.g.b.	Tripoli	885	230	25¾	11¾	2543	Castellamare	1886	1887	72,080	..	1	7 *2·2-in.*	4	18·0	130	107
3rd cl. *cr.*	Umbria	2245	262½	39½	16½	7104 *t*	Leghorn (Orlando)	1891	1893	183,120	4½	2	4 *5·9-in.*, 6 *4·7-in.*, 8 *2·2-in.*, 10 *1·4-in.*, 1 1., 2 M.	2	18·83 *t*	430	257
to.g.b.	Urania	833	230	27	11¼	4397	Sestri (Odero)	1891	1892	72,920	..	1	1 *4·7-in.*, 6 *2·2-in.*, 3 *1·4-in.*	6	20·0	120	111
2nd cl. *cr.*	Vesuvio	3373	282½	42½	19	6820	Leghorn (Orlando)	1886	1888	218,320	5	1·5	2 *9·8-in.*, 6 *5·9-in.*, 1 *2·9-in.*, 5 *2·2-in.*, 8 *1·4-in.*, 2 M.	4	17·0	600	315
g.v.	Volturno	1155	177¼	32¾	14¼	1100	Venice	1887	1888	58,960	..	..	4 *4·7-in.*, 4 *2·2-in.*, 2 *1·4-in.*, 2 M.	..	13·0	206	131

Subsidised auxiliary cruisers and despatch vessels.—Nord America, Vittoria, Duca de Galliera, and Duchessa di Genova (La Veloce S.S. Co.), Regina Margherita, Elettrico, Candia, Malta, Perseo and Orione (Navigazione Generale). The armament of these vessels is 2 2·2-in. Q.F., and 4 1·4-in. M. Amerigo Vespucci, 2795 tons, and Flavio Gioja, 3064 tons, 3rd class cruisers, used for training purposes. Two lagoon gunboats are in hand at private yards, and the coal and liquid fuel transports Bronte and Sterope (9490 tons) at Leghorn. The latter was launched January 15.

JAPAN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Armament. Guns.*	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.						in.	in.	in	in.	in.	in.			knots.	tons.	
a.c.	Adzuma	9436	431½	59¼	24¾	17,000 B.	St. Nazaire	1899	1901	..	7–3½ H. S	3	5 H.S.	..	6 H. S.	6 H.S.	4 8-in., 12 6-in., 12 3-in., 8 1·8-in.	5 (4 sub.)	20·0	600 1270	482
t.	Asahi	15,200	400½	75¼	27¼	15,000 B	Clydebank	1899	1900	..	9–4 H. S.	4–2½	6 H.S.	12 H.S.	14 H. S.	6 H.S.	4 12-in., 14 6-in., 20 12-pr., 8 3-pr., 4 2½-pr.	4 (sub.)	18	700 1549	750
a.c.	Asama	9700	408	67	24¼†	19,000 t	Elswick	1898	1899	..	7–3½ H. S.	2	5 H.S.	..	6	6 H.S.	4 8-in., 14 6-in. (A), 12 12-pr., 8 2½-pr.	5 (4 sub.)	22·1 t	600 1409	482
b.	Chin-Yen	7400	308½	59	20	6200	Stettin	1882	1884	..	14	3	12	..	12	..	4 12-in. (K.), 4 6-in., 8 l., 8 M.	3	14	1000	250
a.c.	Chiyoda	2450	308	42½	14	5700 B.	Clydebank	1889	1890	..	4½	1–2	..	..	..	..	10 4·7-in., 14 3-pr., 3 M.	3	17·5	420	300
b.	Fuji	12,320	374	73	26½	14,000	Thames	1896	1897	..	18–6 H. S.	4–2½	4 H.S.	..	14 H. S.	6 H.S.	4 12-in., 10 6-in., 20 3-pr., 4 4½-pr.	5 (4 sub.)	19·2 18·5 t	1100	600
a.c. ,,	Idzumo Iwate	9750	400	68½	24¼†	17,300 B. t.	Elswick	1899 1900	1901 1901	..	7–3½ H.N.S.	2½	5 H.N.S.	..	6 H. N.S.	6 H. N.S.	4 8-in., 14 6-in., 12 12-pr., 8 2½-pr.	4 (sub.)	22·0 21·7 t	600 1412	672
b.	Kashima	16,400	425	78⅛	26½	15,600 W. T.	Elswick	1905	..	..	9–4 K.S.	3–2	6	6	9 K.S.	6 K.S.	4 12-in., 4 10-in., 12 6-in., 12 12-pr., 3 3-pr., 6 M., 2 l.	5 (sub.)	18½	750 2150	980
a.c.	Kasuga (ex Rivadavia)	7700	344	59¾	24¼	13,500	Sestri Ponente	1902	1904	760,000	6 H. N.S.	1½	6 H. N.S.	6 H. N.S.	6 H. N.S.	6 H. N.S.	1 10-in., 2 8-in., 14 6-in., 10 3-in., 6 1·8 in., 2 M.	4	20·0	600 1150	500
b.	Katori	15,950	420	78	27†	16,000 Nic.	Barrow	Bldg.	..	..	9–5 K.S.	3–2	6	6	10 K.S.	6 K.S.	4 12-in., 4 10-in., 12 6-in., 10 12-pr., 3 3-pr., 6 M., 2 l.	5 (sub.)	18½	750 1800	..
,,	Mikasa	15,200	400	76	27¼	16,431 B.	Barrow	1900	1902	..	9–4 H.N.S.	3	6 H. N.S	12 H. N.S	14 H. N.S.	6 H. N.S.	4 12-in., 14 6-in., 20 12-pr., 8 3-pr., 4 2½-pr., 8 M.	(4 sub.)	18·5 t	700 1520	935
a.c.	Nisshin (ex Moreno)	7700	344	59¾	24¼	13,500	Sestri Ponente	1903	1904	760,000	6 H. N.S.	1½	6 H. N.S.	6 H. N.S.	6 H. N.S.	6 H. N.S.	4 8-in., 14 6-in., 10 3-in., 6 1·8-in., 2 M.	4	20·0	600 1150	500
b.	Shikishima	14,850	400	75½	28½	16,355 B.	Thames	1898	1899	..	9–4 H.N.S.	4–2½	6 H. N.S	12 H. N.S.	14	6 H. N.S.	4 12-in., 14 6-in., 20 12-pr., 8 3-pr., 4 2½-pr., 8 M.	5 (4 sub.)	18·3	700 1722	741
a.c.	Tokiwa	9700	408	67	24¼†	20,556 t.	Elswick	1898	1899	..	7–3½ H. S.	2	5 H.S.	..	6 H. S.	6 H.S.	4 8-in. 14 6-in. (A.), 12 12-pr., 8 2½-pr.	5 (4 sub.)	23·0	600 1409	500
,,	Yakumo	9850	407¾	64¼	23¾	16,000 B.	Stettin	1899	1901	..	7–3½ H. S.	2½	5 H.S.	..	6 H. S.	6 H S.	4 8-in. (A.), 12 6-in., 12 12-pr. (A.), 8 2½-pr.	5 (4 sub.)	20·0	600 1100	500
b.	Yashima‡	12,320	374	73	26½	14,000	Elswick	1896	1897	..	18–6 H. S.	4–2½	4 H.S.	..	14 H. S.	6 H.S.	4 12-in., 10 6-in., 20 3-pr., 4 4½-pr.	5 (4 sub.)	19·2 18·5 t	1100	600

* All Q.F. guns and 12-in. for new ships are Armstrong. † Mean draught. ‡ Reported to have been sunk by a mine in June, 1904.

The old ironclads Hi-yei and Kon-go, of 2200 tons displacement, are now used as training ships; armament, 3 6·6-in. Krupps and 6 5·9-in.

The old central battery ironclad *Fu-So* (3718 tons) built on the Thames, 1877, and sunk off Shikoku Island, 1897, was refloated and repaired.

The battleship Hatsuse was sunk by mines off Port Arthur, May 15, 1904, and the Hei-Yen (2000 tons), by fouling a mine in Pigeon Bay, September 18, 1904.

JAPAN.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.v.	Akagi	615	164	27	10	700	Yokosuka	1889	1891	..	..	..	1 8·2-in., 1 5·9-in., 2 l., 2 M.	..	13·0	..	113
cr.	Akashi	2657	295¼	41¾	16½	8500	Yokosuka	1897	1898	327,000	2	4½ shield	2 6-in. (A.), 6 4·7-in., 10 3-pr., 2 2½-pr., 4 M.	2	20·0	200 / 544	..
,,	Akitsushima	3150	302	42½	18¼	8400	Yokosuka	1892	1893	..	3	..	4 6-in., 6 4·7-in., 10 3-pr.	4	19·0	..	330
g.v.	Atago	615	154	27	10½	700	Yokosuka	1887	1888	..	..	..	1 8·2-in., 1 4·7-in., 2 M.	..	12·0	60	113
t.g.b.	Chihaya	1250	273	31½	10	5500	Yokosuka	1900	1901	..	..	..	2 4·7-in., 4 12-pr.	5	21·0	123 / 344	..
cr.	Chitose	4760	395	49	18	Nor. 15,500	San Francisco	1898	1899	205,200	4½	4½ shield	2 8-in., 10 4·7-in., 12 12-pr., 6 2½-pr.	4	22·5	350 / 1000	405
,,	Hashidate	4277	295	50¾	21½	5400	Yokosuka	1891	1893	..	2	12	1 12·5-in. (Canet), 11 4·7-in., 5 6-pr. 11 3-pr., 6 M.	4	17·0	400	350
,,	Itsukushima	4277	295	50¾	21½	5400	La Seyne	1891	1893	..							
g.v.	Iwaki	700	147	25	11	700	Yokosuka	1883	1884	..	..	..	1 5·9-in., 2 4·7-in.	..	10·0	600	115
,,	Idzumi	2800	270	40	18½	6500	Elswick	1878, 1892	1879	..	3	2¼ shield	2 6-in., 6 4·7-in., 7 6-pr., 2 M.	..	17.4 t	400	300
cr.	Kasagi	5416	374½	48¾	19	13,492	Philadelphia	1898	1899	205,200	4½–1¾	4½ shield	2 8-in., 10 4·7-in., 12 12-pr., 6 1·8-in.	4	22·7 t	350 / 1000	405
t.c.	Katsuraki	1476	206¾	36	15	1600	Yokosuka	1885	1887	..	..	..	2 6-in. (K.), 5 4·7-in., 2 M.	2	13·0	..	242
t.c.	Musashi																
g.v.	Maya	615	154	27	10	700	Yokosuka	1886	1887	..	..	..	1 8·2-in., 1 4·7-in., 2 M.	..	13·0	60	113
cr.	Matsushima	4277	295	50¾	21½	5400	La Seyne	1890	1892	..	2	12	1 12·5-in. (Canet), 11 4·7-in., 5 6-pr., 11 3-pr., 6 M.	4	17·5 t	400	350
,,	Miyako*	1800	314¾	36	13½	6130	Kure	1899	1901	..	..	..	2 4·7-in., 10 1·8-in.	2	20·0	..	..

* Sunk by mines at Port Arthur.

JAPAN.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Naniwa	3700	300	46	18½	7235	Elswick	1885	1886	..	3	1½ shield	2 *10·2-in.* (A.), 6 *6-in.*, 2 *3-pr.*, 10 M.	4	18·72	800	350
"	Niitaka	3365	235½	44	16½	10,000 Nic.	Yokosuka	1902	..	..	2½	..	6 *6-in.*, 10 *3-in.*, 4 *2½-pr.*	..	*t* 20·0	600	..
g.v.	Oshima	630	164	27	10	700	Yokosuka	1890	1891	..	..	..	4 *4·7-in.*, 8 l.	..	13·0	140	130
cr.	Otawa	3000	341	42½	17	10,000 Y.	Yokosuka	1903	1904	..	..	..	2 *6-in.*, 6 *4·7-in.*, 4 *12-pr.*, 2 M., 2 l.	..	21·0	600	..
"	Suma	2657	306¾	40	16¼	8500	Yokosuka	1896	1898	237,000	2 shield	4½ 4 M	2 *6-in.*, 6 *4·7-in.*, 12 *3-pr.*	2	20·0	875 200	..
"	Takao	1774	230	33	13	2330	Yokosuka	1888	1889	..	..	..	4 *6-in.*, 1 *4¾-in.* do., 6 M.		15·0	300	255
"	Takachiho	3700	300	46	18½	7500	Elswick	1885	1886	..	3	1½ shield	2 *10·2-in.* (A.), 6 *6-in.*, 2 *3-pr.*, 10 M.	4	18·7	800	365
"	Takasago	4535	360	46½	18¼	15,500 B.	Elswick	1897	1898	..	4½	4½ shield	2 *8-in.*, 10 *4·7-in.*, 12 *12-pr.*, 6 *2½-pr.*	5	*t* 23·0	350 1000	400
to.g.b.	Tatsuta	875	240	27½	13	5500	Elswick	1894	1894	..	..	..	2 *4·7-in.*, 4 *3-pr.*	5	21·0	200	..
"	Ten-riu	1500	200	32	16½	1250	Japan	1882	1885	..	..	..	1 *6·6-in.* (K.), 6 *4·7-in.*, 2 l.	..	12·0	256	222
cr.	Tsukushi (*ex* Arturo Prat)	1350	210	32	15	2887	Elswick	1882	1893	..	..	..	2 *10-in.* (A.), 4 *4·7-in.*, 2 l., 4 M.	2	16·5	250	190
"	Tsushima	3365	235½	44	16½	10,000 Nic.	Kure	1902	..	..	2½	..	6 *6-in.*, 10 *3-in.*, 4 *2½-pr.*	..	*t* 20·0	600	..
g.b.	Uji	620	180	27¾	10	1000 B.	Kure	1903	..	..	..	..	4 *12-pr.*, 3 M.	..	13·0	100	..
cr.	Yayeyama	1600	315	34½	15	6000 Nic.	Yokosuka	1889	1890	..	..	..	3 *4·7-in.*, 6 M.	2	20·0	..	200
"	Yamato	1476	206¾	36	15	1600	Yokosuka	1885	1886	..	..	..	2 *6·6-in.* (K.), 5 *4·7-in.*, 4 M.	2	13·0	..	242

The gunboats Chen-Pei, Chen Pien, Chen Nan, Chen Hsi, Chen Chung and Chen Tung (440 tons) were captured from the Chinese.
Some gunboats are being constructed at Yokosuka; also two river gunboats, the Sumida and Fushima.
Messrs. Thornycroft have built a river gunboat of 13·27 knots speed.
The Sai-yen (2264 tons) was sunk by mines, and the Yoshino was sunk by collision, off Port Arthur.

NETHERLANDS.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
c.d.s.t.	De Ruyter	5014	316¾	51½	21¾	6377 t.	Amsterdam	1900	1904	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 8 *2·9-in.*, 4 *1·4-in.*	3 2 sub.	16·5 t	680	444
,,	Evertsen	3464	282¾	47	16¾	4735	Flushing	1894	1896	..	6·4 H.S.	2	..	..	9½ H.S.	3 H.S.	3 *8·2-in.*, 2 *5·9-in.*, 6 *2·9-in.*, 8 *1·4-in.*	3	16·0	280	268
,,	Hertog Hendrik	5014	316¾	51½	21¾	6000 Y.	Amsterdam	1902	1903	347,500	6 H.N.S.	2	..	..	10 H.N.S.	3 H.S.	2 *9·4-in.*, 4 *5·9-in.*, 8 *2·9-in.*, 4 *1·4-in.*, 2 l.	3	16·5	680	444
,,	Koningin Regentes	5014	316¾	51½	21¾	7290 Y.	Amsterdam	1900	1902	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	..	2 *9·4-in.*, 4 *5·9-in.*, 8 *2·9-in.* 4 *1·4-in.*, 2 l.	3 2 sub.	16·5	680	444
t. & b.	Koningin Wilhelmina der Nederlanden . shd.	4527	327½	48¾	20	4600	Amsterdam	1892	1894	..	..	3	..		11	..	1 *11-in.*, 1 *8·2-in.*, 2 *6·6 in.*, 2 *6·6-in.*, 4 *2·9-in.*, 4 *1·4-in.*, 6 *1·4-in.*, 2 M.	4	16·5	448	293
c.d.s.t.	Kortenaer	3464	282¾	47	16¾	4658	Amsterdam	1894	1896	..	6 H.S.	2	..	..	9½ H.S.	3 H.S.	3 *8·2-in.*, 2 *5·9-in.*, 6 *2·9-in.*, 8 *1·4-in.*	3	16·0	280	260
,,	Piet-Hein	3464	282¾	47	16¾	4736 t	Rotterdam	1894	1896	..	6 H.S.	2	..	..	9½ H.S.	3 H.S.	3 *8·2-in.*, 2 *5·9-in.*, 6 *2·9-in.*, 8 *1·4-in.*	3	16·2 t	280	260
t. & b.	Reinier Claeszen	2440	229½	44½	15	350	Amsterdam	1891	1892	..	4¾–2 *comp.*	3	..	..	11 *comp.*	6 *comp. shield*	1 *8·2-in.* (K.), 1 *6·6-in.*, 1 *2·9-in.*, 4 *1·9-in.*, 3 *1·4-in.*	2	12·5 t	88	160
,,	Tromp / No. 5 (E).	5211	316¾	51½	21¾	6000 Y.	Amsterdam	1904 Bldg.	..	347,500	6–4 H.N.S.	2	..	..	10 H.N.S.	..	2 *9·4-in.*, 4 *5·9-in.*, 10 *2·9-in.*, 4 *1·4-in.*, 2 l.	3 2 sub.	16·0	680	441

Two coast defence vessels of 850 tons and three monitors of 680 tons, projected.

Coast defence monitors (launched 1868–78) Schorpioen, Stier, Matador, Draak, Luipaard, Wesp, Haai, Hyena, Panter, Bloedhond, Cerberus, Krokodil and Heiligerlee, 2200 tons to 1500 tons.

NETHERLANDS.—Cruising Ships.

((I) denotes vessels of the Dutch Indian Navy.)

Class.	NAME.		Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
			tons.	ft.	ft.	ft.					£	inches.	inches.			knots.	tons.	
g. v.	Assahan (I)		787	179	30¾	11½	1353	Rotterdam	1900	1900	..	..	..	3 4·7-in., 2 2·9-in., 4 1·4-in.	..	13·0	120	95
„	Borneo (I)	shd.	787	179½	31	13½	1040	Glasgow	1892	1893	..	..	..	6 4·1-in., 1 2·9-in., 2 1·4-in., 2 M.	..	13·0	124	106
„	Ceram (I)	shd.	541	176	25½	10¼	800	Flushing	1887	1887	..	..	..	3 4·7-in. (K.), 1 2·9-in., 2 1·4-in.	..	12·5 t	70	82
„	Edi (I)		787	179½	30¾	11¾	1100	Flushing	1897	1898	..	..	..	3 4·7-in., 2 2·9-in., 4 1·4-in.	..	13·0	113	95
„	Flores (I)	shd.	541	176	25½	11½	650	Amsterdam	1887	1888	..	..	..	3 4·7-in., 1 2·9-in., 2 1·4-in.	..	11·7	75	82
cr.	Friesland		3847	307	49	17¾	10,000 Y.	Rotterdam	1896	1898	285,700	2	..	2 5·9-in., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 smaller.	4	19·8 t	400	333
„	Gelderland		3969	310¾	49	17¾	10,000 Y.	Feijenoord	1898	1900	..	2¼	..	2 5·9-in., 6 4·7-in., 4 2·9-in., 4 1·4-in., 4 M.	4	20·0	850	333
„	Holland		3847	307	49	17¾	10,000 Y.	Amsterdam	1896	1898	285,700	2	..	2 5·9-in., 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	19·6 t	400	333
g. v.	Java (I)	shd.	1279	205¼	31½	14	1050	Rotterdam	1885	1887	..	..	..	1 5·9-in., 3 4·7-in., 1 2·9-in., 2 1·4-in.	..	12·5 t	160	104
„	Koetei (I)		778	179	30¾	11½	1412	Amsterdam	1898	1899	..	..	..	3 4·7-in., 2 2·9-in., 4 1·4-in.	..	13·0	120	97
„	Lombok (I)	shd.	591	176	27½	11	990	Amsterdam	1891	1892	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr.	..	12·0	55	84
„	Mataram (I)		797	179½	30¾	11¾	1100	Amsterdam	1896	1897	..	..	..	3 4·7-in., 2 3-in., 2 1·4-in.	..	13·0	113	95
„	Nias (I)		797	179½	30¾	11¾	1227	Amsterdam (Huygens)	1895	1896	..	..	..	3 4·7-in., 2 2·9-in., 4 1·4-in.	..	13·0	120	95
cr.	Noord-Brabant		3969	310¾	49	17¾	10,000 Y.	Flushing	1899	1901	..	2¼	..	2 5·9-in., 6 4·7-in., 4 2·9-in., 4 1·4-in., 4 M.	4	20·0	850	333
cr.	Serdang (I)		797	179½	30¾	11¾	1100	Flushing	1897	1898	..	..	..	3 4·7-in., 2 2·9-in., 4 1·4-in.	..	13·0	113	95
g.v.	Siboga (I)		778	179	30¾	11½	1395	Amsterdam	1898	1899	..	..	..	3 4·7-in., 2 2·9-in., 4 1·4-in.	..	13·0	120	95
sl.	Sommelsdijk	shd.	997	178½	31	14	700	Amsterdam	1881	1882	..	..	..	1 5·9-in., 3 4·7-in. (K.), 1 2·9-in.	..	10·0	150	88
cr.	Sumatra (I)		1693	229½	37	14	3750	Amsterdam	1890	1892	..	1½	..	1 8·2-in., 1 5·9-in., 2 4·7-in., 1 2·9-in., 4 3-pr., 2 M.	..	17·0	225	183
g.v.	Sumbawa (I)		591	176	26½	11¼	930	Flushing	1891	1892	..	..	..	3 4·7-in., 1 2·9-in., 2 3-pr.	..	12·5 t	60	84
cr.	Utrecht		3969	310¾	49	17¾	10,000 Y.	Amsterdam	1898	1900	..	2¼	..	2 5·9-in., 6 4·7-in., 4 2·9-in., 4 1·4-in., 4 M.	4	20·0	850	333
cr.	Van Speyk	shd.	3669	302	41	23	2891	Amsterdam	1880	1881	..	..	..	6 6·6-in. 6-ton, 8 4·7-in. (K.), 2 2·9-in., 6 3-pr. 2 M.	..	14·0	360	280
cr.	Zeeland		3847	307	49	17¾	10,589 Y. t	Flushing	1897	1898	285,700	2	..	2 5·9-in. 6 4·7-in., 4 2·9-in., 8 1·4-in., 4 M.	4	19·4 t	400	333

Gun-vessels of the Indian Navy: Arend, Flamingo, Raaf, Reiger, Zeeduif, Zwaan, Pelikaan, Condor, Gier, Zeemeeuw, Zwaluw (400 tons), launched between 1880 and 1891; Glatik (417 tons), 1894; Havik, Snip, Sperwer, Kwartel, Favant, and Valk between 1894 and 1903; Argus and Cycloop (438 tons), 1893.

Sixteen Gunboats (*Staunch class*) of 268 tons; also *three small gunboats* of 210 tons, *one steel gunboat* of 108 tons, and the old frigate Koningin Emma der Nederlanden.

Bellona (920 tons), gunnery training ship.

NORWAY.—Armoured Ships.

Class.	NAME	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Second-ary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			in.	in.			knots.	tons.	
c.d.s.	Eidsvold . / New Ship .	3847	290	$50\frac{1}{2}$	$16\frac{1}{2}$	4500 Y.	Elswick	1900 / Bldg.	1901 / ..	..	6 H.N.S.	2	..	..	6 H.N.S.	6 H N.S.	2 *8·2-in.*, 6 *5·9-in.*, 8 *12-pr.*, *pr.*	2 sub.	16·5 *t*	400 / 600	261
,,	Norge .	3847	290	$50\frac{1}{2}$	$16\frac{1}{2}$	4500 Y.	Elswick	1900	1901	..	6 H.S.	2	..	..	6 H.S.	6 H.S.	2 *8·2-in.*, 6 *5·9-in.*, 8 *12-pr.*, 6 *3-pr.*	2 sub.	16·5 *t*	250 / 400	248
,,	Harald Haar-fagre .	3556	280	$48\frac{1}{2}$	$16\frac{1}{2}$	3700	Elswick	1896	1898	190,000	7 H.S.	2	..	..	8 H.S.	..	2 *8-in.*, 6 *4·7-in.*, 6 *12-pr.*, 6 *$1\frac{1}{2}$-pr.*	2 sub.	17·2 *t*	200 / 500	248
,,	Torkenskjold							1897	1899												

Also the old monitors Mjölner, Skorpionen, Thor and Thrudvang.

Cruising Ships.

Class.	NAME	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.b.	Æger .	387	$108\frac{1}{2}$	$29\frac{1}{2}$	8	450	Horten	1892	1893	..	$1\frac{1}{2}$	..	1 *8·2-in.*, 1 *2·7-in.* 2 *1·9-in.*	..	9·0	..	43
g.v.	Ellida .	984	187	$32\frac{3}{4}$	$14\frac{1}{4}$	900	Horten	1880	1881	..	..	..	5 *5·9-in. 4-ton* (K.), 1 *4·7-in.*, 1 l., 2 M.	1	12·0	97	128
,,	Frithjof .	1349	$216\frac{1}{2}$	$32\frac{3}{4}$	$13\frac{1}{4}$	300	Horten	1896	1898	..	..	..	2 *4·7-in.*, 4 *2·9-in.* 4 *1·4-in.*, 2 l.	3 1 sub.	15·0	120	156
,,	Heimdal .	620	$167\frac{1}{4}$	$26\frac{3}{4}$	$11\frac{3}{4}$	700	Christiania	1892	1893	..	..	..	4 *2·5-in.*	..	12·0	92	62
,,	Sleipner .	571	$173\frac{3}{4}$	26	$9\frac{1}{2}$	800	Horten	1877	1878	..	..	..	1 *10·2-in. 22-ton* (K.), 1 *5·9-in. 4-ton* do., 1 M.	1	12·0	80	87
to g.b.	Valkyrien.	374	190	$24\frac{1}{4}$	$9\frac{1}{4}$	3300 †	Elbing.	1896	1897	..	..	..	2 *2·7-in.* 1 M.	2	23·2*t*	90	57
g.v.	Viking .	1095	$203\frac{1}{2}$	$30\frac{1}{2}$	13	2000	Horten	1891	1892	..	$1\frac{1}{2}$	..	2 *5·9-in.* (A.), 4 *2·5-in.*, 4 *1·4-in.*, 2 M.	3	15·0	140	156

Eleven Gunboats, of 189 to 280 tons, and of 180 to 450 I.H.P., armed with one large gun and machine guns in each.
Sixteen smaller Gunboats, of 60 tons, 70 I.H.P., and $7\frac{1}{2}$ knots speed; each armed with one $5\frac{1}{4}$-inch gun. Also several smaller gunboats.
A first-class gunboat, No. 4, of 395 tons, in hand. A despatch vessel, 850 tons, laid down in 1902.

PORTUGAL.—Armoured Ship.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.						Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Gun Position. Secondary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots	tons.	
b.	Vasco da Gama	2972	233	40	18¼	6000 W.T.	Blackwall Leghorn	1876 1903	1878	132,000	9¾-4	3	6 K.S.	..	7¾ K.S.	..	2 *8-in.*, 4 *4·7-in.*, 2 *2·5-in.*, 2 *1-pr.*, 4 M.	2 (sub.)	15·5 *t*	300	218

The Vasco da Gama has been reconstructed by Messrs. Orlando at Leghorn; she has been lengthened 23 ft., rearmed and reboilered.

Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Adamastor	1962	250	35	14	4000	Leghorn	1896	1897	..	3	5	2 *5·9-in.*, 4 *4·7-in.*, 4 *2·2-in.*, 4 M.	3	18·0 *t*	270	232
corv.	Affonso de Albuquerque	1111	203	33	13½	1360	Blackwall	1884	1885	56,500	..	..	2 *6-in.* (A.), 5 *4·7-in.*, 2 *2·5-in.*, 2 M.	...	13·3 *t*	140	183
„	Diu	717	147	27½	13	700	Lisbon	1889	1891	..	..	..	1 *5·9-in.* (K.), 2 *4·7-in.*, 1 *3-pr.*, 2 M.	..	12·0	80	114
cr.	Dom Carlos I.	4100	360	46½	17½	12,500 Y.	Elswick	1898	1899	..	4	..	4 *5·9-in.* (A.), 8 *4·7-in.*, 12 *3-pr.*, 6 *1-pr.*, 4 M.	5 (3 sub.)	22·0	1000	260
g.v.	Dom Luiz I.	710	151	27¼	13¾	512	Lisbon	1895	1896	..	..	..	4 *4·1-in.*, 3 *2·5-in.*, 3 M.	..	9·9	100	..

PORTUGAL.—Cruising Ships—*continued*.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	inches.	inches.			knots.	tons.	
g.v. . .	Liberal . .	580	140	25½	10½	580	Birkenhead .	1884	1886	32,500	..	..	1 *6-in. 4-ton* (A.), 3 *4-in.*, 2 M.	..	11·0	90	109
" . .	Patria . .	620	196¾	27½	8½	1800	Lisbon .	1903	..	..	..	..	4 *4-in.*, 6 *1·8-in.* . .	..	15·0	..	..
cr. . .	Rainha Amelia	1640	246	36	14¾	5000 Nor.	Lisbon .	1899	1901	..	1	..	4 *5·9-in.*, 2 *3·9-in.*, 2 3-*pr.*, 4 M.	2	20·6 *t*	..	250
" . .	São Gabriel / São Rafael	1772	246	35½	14¼*	4000 N.S.	Havre .	1898	1899	..	1½	..	2 *5·9-in.* (*Canet*), 4 *4·7-in.*, 8 *1·8-in.*, 2 M.	1	17·5 *t*	500	200
g.b. . .	São Salvador .	710	151	27¼	13¾	..	Lisbon .	Bldg.	..	..	..	..	4 *4·1-in.*, 3 *5·2-in.*, 3 M. .	..	11·0	100	..
to.g.b. .	Tejo . . .	522	229½	23	..	7000	Lisbon .	1901	1902	..	..	..	1 *3-in.*, 6 *1·8-in.* . .	3	25·0	..	85
g.b. . .	Vouga . .	718	160¾	27½	12	600	Lisbon .	1882	1883	..	..	..	4 *4-in.*, 2 *1·8-in.*, 2 M. .	..	10·0	100	109
" . .	Zaire . . .	580	140	25½	10½	580	Birkenhead .	1884	1885	32,500	..	..	1 *6-in.* (A.), 3 *4-in.*, 2 M. .	..	11·0	90	109
" . .	Zambeze . .	627	143	25¾	12	500	Lisbon .	1886	1887	..	..	..	1 *6-in.* (A.), 2 *4-in.*, 2 M. .	..	10·0	85	107

* Mean draught.

Seventeen small gunboats and about 29 light-draught steel river-gunboats. Two gunboats of 220 tons, the Al. Baptista de Andrade and Thomaz Andrea for Mozambique and Timor.

RUSSIA.—Armoured Ships.

(B.S., Black Sea Fleet.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkheads.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Adm. Nakhimoff shd.	8524	333	61	25	9000 B.	St. Petersburg.	1885 1900	1888	572,000	10–6 *comp.*	3	..	..	8 *comp.*	..	8 *8-in.*, 10 *6-in.*, 10 Q.F., 4 *3-pr.*, 6 M.	4	16·7 *t*	1200	567
c.d.s.	Adm. Oushakoff	4648	265	52½	17	5000	St. Petersburg	1893	1895	410,000	10	3	..	..	7–8	..	4 *9-in.*, 4 *6-in.*, 6 *1·8-in.*, 8 M.	4	16·0	400	318
”	Adm. Seniavin .	4792						1894	1895												
b.	Alexander II . shd.	9244	326	67	23	8000	St. Petersburg.	1887	1890	..	14–6 *comp.*	2½	..	6 *comp.*	10 *comp.*	6 *comp.*	2 *12-in.*, 4 *9-in.*, 8 *6-in.*, 4 *6-pr.*, 4 *3-pr.*, 6 M.	5	16·5 *t*	1200	604
”	Alexander III (Imperator)	13,516	367½	76	26	16,000 B.	St. Petersburg. (Baltic)	1901	1904	..	9–4 K.S.	2½–1½	6 K.S.	9 K.S.	10 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *3-pr.*, 6 *1-pr.*	6 2 sub.	18·0	1250 2000	740
”	Andrei Pervozvannui	16,630	429¾	79¾	28½	18,000 B.	St. Petersburg. (Galerny)	Bldg.	..	1,170,000	..	..	..	..	..	..	4 *12-in.*, 12 *8-in.*, 20 *12-pr.*, 20 *3-pr.*, 6 *1-pr.*, 8 M. 2 l.	4 2 sub.	18·0	..	..
b.	Borodino . . .	13,516	367½	76	26	16,000 B.	St. Petersburg (New Admiralty)	1901	1904	..	9–4 K.S.	2½–1½	6 K.S.	9 K.S.	10 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *3-pr.*, 6 *1-pr.*	6 2 sub.	18·0	1250 2000	740
”	Catherine II., B.S. .	10,180	331	69	26½	10,600 B.	Nicolaieff .	1886	1889	900,000	18–10 *comp.*	3	14 *comp.*	..	14 *comp.*	..	6 *12-in.*, 7 *6-in.*, 8 *6-pr.*, 6 M.	7	15·5 *t*	886	325
”	Cesarevitch* . .	12,912	388¾	76¼	26	16,300 B.	La Seyne .	1901	1902	..	9¾–4 K.S.	2½	6 K.S.	9 K.S.	10–11 K.S.	6¾ K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *1·8-in.*, 6 *1·4-in.*, 4 M., 2 l.	6 2 sub.	19·6 *t*	900 1350	732
a.c.	Dmitri Donskoi shd.	6200	296½	52	24¼	7000	St. Petersburg.	1883	1885	..	6	2½	..	10	10	..	6 *6-in.*, 10 *4·7-in.*, 16 Q.F. and M., 4 l.	4	16·5	400	510
t.	Dvenadzat Apostoloff (Twelve Apostles), B.S.	8433	330	60	25½	11,500	Nicolaieff .	1890	1892	..	14–6 *comp*	2½	10 *comp.*	12 *comp.*	12 *comp.*	5 *comp.*	4 *12-in.*, 4 *6-in.*, 8 *3-pr.*, 10 M.	6	16·6 *t*	800	500
”	Evstafi, B.S. . .	12,733	372¼	72¾	27	10,600 B.	Nicolaieff .	Pro.		..	9–3 K.S.	2½	6 K.S.	7–5 K.S.	10 K.S.	5 K.S.	4 *12-in.*, 4 *8-in.*, 12 *6-in.* 14 *3-in.*, 8 *1·8-in.* 2 *1·4-in.*, 6 M., 2 l.	2	16	1250	731
a.c.	General Admiral shd.	4722	285½	49¼	21	4472	St. Petersburg	1873	1875	..	6	..	..	..	..	..	6 *8-in.*, 2 *6-in.*, 10 Q.F. and M., 5 l.	4	14·2 *t*	1000	312

* Interned by the Germans at Kiao-chau, Aug., 1904.

RUSSIA.—Armoured Ships—*continued.*

(B.S., Black Sea Fleet.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Secondary.	Armament. Guns. B.L.R. are of Russian Krupp pattern.	Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.	General Admiral Apraxine	4126	277½	52½	17½	5757 *t*	St. Petersburg (New Admiralty)	1896	1898	..	10 H.S.	3	..	..	7·8 K.S.	..	3 *10-in.*, 4 *6-in.*, 6 *1·8-in.*, 8 *1·4-in.*	4	15·0 *t*	215	318
a.c.	Gertzog Edinburgski	5050	285½	49¼	21	5222	St. Petersburg	1875	1877	..	6	..	..	..	6	..	4 *8-in.*, 5 *6-in.*, 12 Q.F., 6 l.	2	15·2 *t*	1000	500
b.	Georgi Pobiedonosetz (George the Victorious), B.S.	10,280	320	69	26½	10,600 13,468 *t*	Sebastopol	1892	1896	*431,000	16–11	..	12	..	12	..	6 *12-in.*, 7 *6-in.*, 8 *3·9-in.*, 6 M.	7	16·5 *t*	700	500
a.c.	Gromoboi † . . shd.	12,336	473	68½	26	14,500	St. Petersburg (Baltic)	1899	1900	..	6 H.S.	3	4¾ H.S	6 H S.	6 H.S.	4¾ H.S.	4 *8-in.*, 16 *6-in.*, 6 *4·7-in.*, 20 *3-in.*, 36 small Q.F. and M.	5 4 sub.	20·0	2500	814
a.g.b.	Grozjastchy . .	1492	229	41¾	11	2000 B.	St. Petersburg	1890	1891	..	5	1½	..	3½	..	..	1 *9-in.*, 1 *6-in.*, 8 Q.F.	2	15·0	100	120
b.	Ioann Zlatoust, B.S. .	12,733	372¼	72¾	27	10,600 B.	Sebastopol	Bldg.	..	..	9–3 K.S.	2½	6 K.S.	7–5 K.S.	12–10 K.S.	5 K.S.	4 *12-in.*, 4 *8-in.*, 12 *6-in.*, 14 *3-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 6 M., 2 l.	2	16·0	670‡	636
a.g.b.	Khrabry . . .	1492	229	41¾	11	3000 Nic	St. Petersburg (New Admiralty)	1895	1896	..	5	1½	..	3½	..	..	1 *9-in.*, 1 *6-in.*, 8 Q.F.	2	15·0	100	120
t.	Kniaz Potemkine Tavritchesky, B.S.	12,480	372¼	72¾	27	10,600 B.	Nicolaieff	1900	1902	..	9·3 K.S.	2½	6 K.S.	7–5 K.S.	12–10 K.S.	5 K.S.	4 *12-in.*, 16 *6-in.*, 14 *3-in.*, 6 *1·8-in.*, 14 *1·4-in.*, 6 M., 2 l.	5 sub.	17·0	670‡	636
b.	Kniaz Souvaroff .	13,516	367½	76	26	16,000 B.	St. Petersburg (Baltic)	1902	1904	..	9–4 K.S.	2½–1½	6 K.S.	10 K.S.	10 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *3-pr.*, 6 *1-pr.*	6 2 sub.	18·0	1250 / 2000	740
t.	Navarin . .	10,206	338	67	25	9000	St. Petersburg	1891	1895	772,995	16 *comp.*	3	12 *comp.*	12 *comp*	12 *comp.*	5 *comp.*	4 *12-in.*, 8 *6-in.*, 14 Q.F., 4 l.	6	16·0	1200	630
,,	Nicolai I . . shd.	9672	326	67	23	8000 B.	St. Petersburg	1888 1900 *	1892	453, §	14–6 *comp.*	2½	..	..	10 *comp.*	6 *comp.*	2 *12-in.*, 4 *9-in.*, 8 *6-in.*, 12 Q.F., 8 M., 4 l.	6	14·8 *t*	..	604
b.	Orel	13,516	367½	76	26	16,000 B.	St. Petersburg (Galerny)	1902	1904	..	9–4 K.S.	2½–1½	6 K.S.	9 K.S.	10 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *3-pr.*, 6 *1-pr.*	4 2 sub.	18·0	1250 / 2000	740
t.	Oslabya . . .	12,674	401½	71½	26	14,500	St. Petersburg (New Admiralty)	1898	1901	..	9½ H.S.	2¾	6 H.S.	9 H.S.	9 H.S.	6 H.S.	4 *10-in.*, 11 *6-in.*, 16 *3-in.*, 10 *1·8-in.*, 17 *1·4-in.*, 2 l.	6	18·0	1063 / 2056	732
a.c.	Pamyat Azova ** shd.	6734	377	51	23	8000	St. Petersburg	1888	1890	350,000	9 *comp.*	2½	..	8 *comp.*	8 *comp.*	..	2 *8-in.*, 13 *6-in.*, 14 Q.F., and 3 M.	7	18·8 *t*	1000	525
b.	Pavel I (Imperator)	16,630	429¾	79¾	28½	18,000 B.	St. Petersburg (Baltic)	Bldg.	..	1,170,000	..	..	..	..	..	..	4 *12-in.*, 12 *8-in.*, 20 *12-pr.*, 20 *3-pr.*, 6 *1-pr.*, 8 M., 2 l.	4 2 sub.	18·0	..	..
t.	Peter Veliky . .	9891	328½	62¼	23¾	8258	St. Petersburg	1872	1875	..	14–8	3	8	.	8	..	4 *12-in.*, 4 *8·4-in.*, 13 Q.F., 4 l.	1	14·5 *t*	1200	436
a. c.	Rossia †† . . shd.	12,130	480	68½	26	14,500 B.	St. Petersburg	1896	1898	..	10–5 H.S.	2½	4 H.S.	6 H.S.	2 H.S.	2 H.S.	4 *8-in.*, 16 *6-in.*, 12 *3-in.*, 36 small Q.F. & M.	5	20·0	2500 ‖	725
t.	Rostislav, B.S. . .	8880	341	66½	24	8500	Nicolaieff	1896	1899	..	15¾–8 H.S.	2–3	5 H.S.	5 H.S.	15¾ H.S.	6 H.S.	4 *10-in.*, 8 *5·9-in.* (Canet), 12 *1·8-in.*, 4 *1·5-in.*, 2 M.	2–3	16·0	‖550 / 800	624
b.	Sinope, B.S. . .	10,180	331	69	26½	13,000 B.	Sebastopol	1887	1890	900,000	16–11 *comp.*	3	14 *comp.*	12	14 *comp.*	..	6 *12-in.*, 7 *6-in.*, 8 Q.F., 6 M.	7	16·75	886	325
t.	Sissoi Veliky (Sissoi the Great)	10,400	341	66½	24	8500	St. Petersburg	1894	1897	796,333	15¾ H.S.	3	5 H S.	5 H.S.	14 H.S.	5 H.S.	4 *12-in.*, 6 *6-in.*, 12 *1·8-in.*, 4 *1·4-in.*, 2 M.	6	16·0	550	590
b.	Slava . . .	13,516	367½	76	26	16,000 B.	St. Petersburg (Baltic)	1903	..	..	9–4 K. S.	4	6 K.S.	9 K.S.	10 K.S.	6 K.S.	4 *12-in.*, 12 *6-in.*, 20 *3-in.*, 20 *3-pr.*, 6 *1-pr.*	4 2 sub.	18·0	1250 / 2000	740
,,	Tchesmé, B.S. .	10,930	331	69	26½	11,000	Sebastopol	1886	1888	900,000	16 *comp.*	3	14 *comp.*	..	14 *comp.*	..	6 *12-in.*, 7 *6-in.*, 8 Q.F., 6 M.	7	15·0	886	325
,,	Tria Sviatitelia, B.S.	13,318	357½	72¼	27	10,600	Nicolaieff	1893	1896	..	16 H.S.	3	16 H.S.	12 H.S.	16 H.S.	5 H.S.	4 *12-in.*, 8 *6-in.*, 4 *4-in.*, 4 *7-in.*, 56 smaller Q.F. & M.	6 2 sub.	18·0 *t*	1000	582
cir.	Vladimir Monomach shd.	5593	296½	52	24	7000	St. Petersburg	1882	1885	..	10–6 *comp.*	2	..	..	..	..	5 *8-in.*, 12 *6-in.*, 18 Q.F. & M., 4 l.	2	15·2 *t*	400	550

Four coast-defence ships, the Admiral Chichagoff, Greig, Lazareff and Spiridoff, completed 1869–70.

Eight battleships of the Slava class and eight of the Andrei Pervozvannyi class are projected.

The battleship Petropavlovsk was sunk off Port Arthur. The battleships Peresviet, Pobieda, Poltava, Sevastopol, and Retvisan, the armoured cruiser Bayan (7226 tons), and the armoured gunboats Otvazny and Gremiastchy were captured or destroyed at Port Arthur. The armoured cruiser Rurik was sunk in the action of August 14, 1904.

* Exclusive of armament. † Escaped, damaged, to Vladivostock after the action of Aug. 14., 1904. ‡ And liquid fuel, 580 tons. § Exclusive of armament.
‖ And liquid fuel. ** To receive Belleville boilers and be reconstructed. †† Escaped damaged to Vladivostok after the action of Aug. 14, 1904.

RUSSIA.—Cruising Ships, &c.

(B.S., Black Sea Fleet.)

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	ins.				knots.	tons.	
to.g.b.	Abrek	535	212½	24¾	9	4506 *t*	Abo	1896	1897	53,600	½	..	2 *3-in.*, 4 *1·8-in.*	2	21·2 *t*	..	..
2nd cl. *cr.*	Admiral Korniloff	5800	351	48½	20	9000	St. Nazaire	1887 1895	1889	296,000	2½	..	2 *8-in.*, 14 *6-in.*, 6 *1·8-in.*, 6 *1·4-in.*, 5 l.	6	17·5 *t*	1100	425
cr.	Afrika	2590	285½	39¼	17	1350	Chester, U.S.	1877	1879	..	..	..	3 *6-in.*, 6 Q.F., 4 M., 4 l.	..	13·0	975	257
„	Almaz	3285	325	43½	17½	7,500 B.	St. Petersburg (Baltic)	1903	1903	..	2¾	5–3½ K.S.	6 *4·7-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 3 M.†	6	19·0	560	340
„	Asia	2500	269	36	16½	1100	Philadelphia	1878	1880	..	..	..	2 *6-in.*, 5 Q.F., 6 M., 5 l.	..	13·0	750	260
„	Askold *	5905	426½	49¼	20¾	24,000 T.S.	Kiel (Germania)	1900	1901	..	3	4	12 *6-in.*, 12 *3-in.*, 8 *1·8-in.*, 2 *1·4-in.*, 2 M.	6 (2 sub.)	23·8 *t*	720 / 1100	500
„	Aurora	6731	413¼	55¾	21	11,610 B.	St. Petersburg (Galerny)	1900	1902	..	2½	..	8 *6-in.*, 20 *3-in.*, 8 *1·4-in.*	4	20·0	900 / 1400	422
„	Bogatyr †	6645	416¾	54½	20¾	20,300 Nor.	Stettin (Vulcan)	1900	1902	..	2	5 N.S.	12 *6-in.*, 12 *3-in.*, 6 *1·8-in.*, 2 *1·4-in.*, 2 M.	6 (2 sub.)	24·0 *t*	720 / 1100	580
to.g.b.	Captain Sacken, B.S.	742	210	24	8¾	3400	Nicolaieff	1888	1889	40,700	..	..	7 *4·7-in.*, 7 M.	6	18·5 *t*	97	120
g.v.	Chernomoretz, B.S.	1224	210	35	11	1500 B.	Nicolaieff	1889	1891	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·5 *t*	250	161
cr.	Diana ‡	6630	413½	55¾	21	11,610 B.	St. Petersburg (Galerny)	1899	1902	..	2½	..	6 *6-in.*, 20 *3-in.*, 8 *1·4-in.*	4	20·0	900 / 1400	422
corv.	Donetz, B.S.	1224	210	35	11	1500 B.	Nicolaieff	1887	1888	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·5 *t*	250	161
to.g.b.	Gaidamak	400	192½	24¼	7½	3000	Abo	1893	1894	..	..	..	2 *1·8-in.*, 7 *1·4-in.*, 10 M.	3	22·0	90	87
„	Griden, B.S.	400	192½	24¼	7½	3500	Nicolaieff	1893	1894	66,600	..	..	2 *1·8-in.*, 7 *1·4-in.*, 10 M.	3	22·0	90	60
cr.	Izumrud } Jemchug }	3106	347¾	41½	16	17,000 Y.	St. Petersburg (Nevsky)	1903	..	..	2	..	6 *4·7-in.*, 6 *1·8-in.*, 2 *1·4-in.*, 1 M.	5	23·0	600	340
„	Kagul, B.S.	6645	439	54½	20½	19,500	Nicolaieff	1903	..	..	2¾	5–3½ K.S.	12 *6-in.*, 12 *3-in.*, 6 *1·8-in.*	5 (2 sub.)	23·0	720	..
to.g.b.	Kazarsky, B.S.	400	190	24	8½	3500	Elbing	1890	1891	32,500	..	..	9 *1·8-in.* (Hotchkiss)	2	23·0	90	60
g.b.	Khivinetz	1340	230	36	10½	1400 B.	St. Petersburg (New Admiralty)	1904	..	..	..	..	2 *8-in.*, 8 *3-in.*, 4 M.	..	13·0	..	200
corv.	Kreisser	1653	206¾	32¾	16	1800	St. Petersburg	1875	1876	..	..	..	2 *6-in.*, 7 Q.F., 1 M., 4 l.	..	13·0	..	..
g.v.	Kubanetz, B.S.	1224	210	35	11	1500 B.	Sebastopol	1888	1889	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F.	2	13·8 *t*	250	161
to.g.b.	Lieutenant Ilyin	714	230	24	8¾	3500	St. Petersburg	1887	1888	40,150	..	..	7 *3-pr.*, 10 M.	7	20·1 *t*	97	120
g.v.	Mandjur *	1416	210	35	11	1400	Copenhagen	1886	1887	..	1½	..	2 *8-in.*, 1 *6-in.*, 7 Q.F., M., & 4 l.	2	14·0	160	179
corv.	Nayezdnik	1334	206¾	32¾	14	1719	St. Petersburg	1878	1879	..	..	..	3 *6-in.*, 7 Q.F. & M., 4 l.	..	13·0	250	172
cr.	Oleg	6675	439¾	54½	20½	19,500 Nor.	St. Petersburg (New Admiralty)	1903	1904	..	2¾	5–3½	12 *6-in.*, 12 *3-in.*, 6 *1·8-in.*	2 sub.	23·0	600	340
corv.	Oprichnik	1426	206¾	32¾	14	1268	St. Petersburg	1880	1881	..	..	..	3 *6-in.*, 7 Q.F. & M., 4 l.	..	13·0	230	172
cr.	Otchakoff, B.S.	6645	439	54½	20½	19,500 Nor.	Sebastopol	1902	..	..	2¾	5–3½ K.S.	12 *6-in.*, 12 *3-in.*, 6 M.	2 sub.	23 0	720 / 1100	..
3rd cl. *cr.*	Pamyat Merkuriya, B.S.	2997	295	41	17	3000	Toulon	1880	1882	..	..	..	6 *6-in.*, 8 Q.F. & M., 4 l.	2	16·0	1100	200

* Interned at Shanghai. † Damaged at Vladivostock. ‡ Interned by the French at Saigon.

RUSSIA.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
sl.	Plastun	1255	206¾	32¾	14	1268	St. Petersburg	1879	1880	..	..	..	3 *6-in.*, 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g.b.	Posadnik	400	192½	24¼	7½	3600	Elbing	1892	1892	111,000	..	..	2 *1·8-in.*, 7 *1·4-in.*, 3 M.	3	22·0	90	87
3rd cl. *cr.*	Rynda	3508	265¾	46	16	3000	St. Petersburg	1885	1887	..	1½	..	10 *6-in.*, 9 Q.F., M., & 4 l.	..	14·8 *t*	710	322
corr.	Strjelok	1343	206¾	32¾	14	1528	St. Petersburg	1880	1881	..	..	..	3 *6-in.*, 7 Q.F., M., & 4 l.	..	13·0	250	172
cr.	Svietlana	3862	331¼	42¾	18¾	3828 B.	Havre	1896	1897	..	2	4	6 *5·9-in.* (*Canet*), 10 *1·8-in.*	4	20·2 *t*	1000	360
g.v.	Teretz, B.S.	1224	210	35	11	1500 B.	Sebastopol	1888	1889	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·8 *t*	250	161
”	Uraletz, B.S.	1224	210	35	11	1500 B.	Sebastopol	1888	1890	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·8 *t*	250	161
cr.	Vitiaz	6375	414	52½	20¾	20,000 B.	St. Petersburg (Galerny)	Bldg.	..	..	2¾	5–3½ K.S.	12 *6-in.*, 12 *3-in.*, 8 *1·8-in.*	5 (2 sub)	23·0	720	..
sl.	Vjestnik	1255	206¾	32¾	14¼	1268	St. Petersburg	1879	1880	..	..	..	3 *6-in.*, 7 Q.F. & M., & 4 l.	..	13·0	250	172
to.g.b.	Voevoda	400	192½	24¼	7½	3600	Elbing	1892	1902	111,000	..	..	2 *1·8-in.*, 7 *1·4-in.*, 3 M.	3	22·0	90	87
”	Vzadnik	400	192½	24¼	7½	3000	Abo	1893	1894	..	..	..	4 *1·8-in.*, 7 *1·4-in.*, 10 M., & 1.	3	22·0	90	97
g.v.	Zaporojetz	1224	210	35	10	1500	Nicolaieff	1887	1889	40,000	..	..	2 *8-in.*, 1 *6-in.*, 7 Q.F. & M.	2	13·5 *t*	250	161

Baltic:—*Ten Gunboats* (*Staunch Class*), of 270 to 402 tons, and *two Gunboats*, of about 180 tons. Black Sea:—*Twelve Steamers* (*Gun-vessels*, *Despatch-vessels*, *&c.*), 90 to 298 tons. Okean, *coal transport*, 12.000 tons, 18 knots, launched at Kiel, 1901. *Kamchatka*, floating workshop, launched at the new Admiralty Yard, St. Petersburg, Nov. 1, 1902. Torpedo transports and mining vessels Volga and Bakan. The Lena (ex Kherson), 10.225 tons, Angara (ex Moskva), Rion (ex Smolensk), 11,850 tons, and Dnieper (ex Petersburg), 9252 tons, are transport vessels of 19 or 20 knots taken over from the Volunteer Fleet and renamed. The Orel, taken from the same fleet, has been converted into a hospital ship.

The cruiser Boyarin and gunboat Bobr were destroyed by mines at Dalny; the cruiser Novik was driven ashore at Korsakoff Bay; the cruiser Pallada was sunk in action. Aug. 10, the sloops Djigit, Razboynik and Zabiyaka, and the gunboat Gilyak, destroyed at Port Arthur.

Auxiliary Steamers.

Class.	NAME.	Material of Hull.	Displacement.	Length.	Beam.	Draught.	Propellers.	Indicated Horse-Power.	Where Built.	Date of Launch.	Speed.
	BLACK SEA CO.		tons.	ft. in.	ft. in.	ft. in.					
Auxiliary Cruiser	Czar	S.	2340	319 0	37 0	23 6	1	350 nom.	Newcastle	1883	14
"	Czarevna	"	2340	319 0	37 0	23 6	1	350 nom.	"	1883	14
"	Czaritza	"	2340	319 0	37 0	23 6	1	350 nom.	"	1883	14
"	Grand Duke Alexis	"	2350	284 0	37 0	14 9	1	3500	Hebburn	1890	16
"	Grand Duke Constantine	"	2400	284 0	37 0	15 0	1	3500	"	1891	16
"	Grand Duke No. 1	"	2400	288 0	37 0	15 0	1	2500	"	Bldg.	14½
"	Grand Duke No. 2	"	2400	288 0	37 0	15 0	1	2500	"	"	14½
"	Emperor Nicolas II.	"	..	..	..	..	..	..	"	1895	..
"	Roumantzeff	"	760	212 0	28 0	7 6	2	1000	"	1894	13
	VOLUNTEER FLEET.										
"	Kazan	"	9755	400 0	49 3	24 0	1	4000	Hebburn	1900	12
"	Kiev	"	10,500	440 0	49 6	24 0	2	3200	Clydebank	1895	13
"	Kostroma	I.	7975	360 0	42 0	23 6	1	2700	Hebburn	1888	14
"	Nijni Novgorod	"	7876	325 0	40 0	23 6	1	2000	Elswick	1891	11½
"	Poltava	S.	10,225	493 0	54 3	24 0	2	12,500	Dumbarton	Bldg.	19½
"	Saratoff	"	8556	462 0	50 0	24 0	2	10,000	Glasgow	1892	19
"	Tamboff	"	8640	385 0	45 0	24 6	1	2,500	Dumbarton	1893	12¾
"	Vladimir	"	10,500	440 0	49 6	24 0	2	3,200	"	1895	12
"	Voronej	"	10,500	440 0	49 6	24 0	2	3,200	"	1895	12
"	Yaroslav	"	8640	385 0	45 0	24 6	1	2,500	"	1893	12¾

SPAIN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Second-ary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in	in.	in.	in.	in.	in.			knots.	tons.	
a.c.	Cardenal Cisneros	6889	347¾	60¼	25	15,000	Ferrol .	. 1897	1902	600,000	12–8	2	..	8	8	2¾	2 11-in., 8 5·5-in., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	5	20·7 t	1200	
„	Cataluña .	. 6889	347¾	61	21¾	15,000	Cartagena	. 1900	..	600,000	12-10	2	..	12	10½	..	2 11-in., 10 5·5-in., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	5 sub.	20·0	1200	484
„	Emperador Carlos V	9089	380	67	25	18,500	Cadiz (Vea Murguia)	1895	1898	734,000	2	6½–2	2	..	10	2	2 11-in. (Hontoria), 8 5·5-in., 4 3·9-in., 2 2·7-in., 4 2·2-in., 6 M.	6	20·0	1200	535
br.	Numancia	. 7190	314¾	55¾	25¼	3708	La Seyne	. 1863 1897	1865	315,600	5½	..	4¾	..	5	4¾	4 8-in., 4 6·2-in., 10 5·9-in. .	2	8·0	1100	600
b.	Pelayo .	. 9744	330	66	25	9000 Nic.	La Seyne	. 1887 1897	1890	..	17¾	4	..	..	19¼	4 H.S.	2 12·5-in., 2 11-in., 9 5·5-in., 6 smaller, 12 M.	7	16·0	800	600
a.c.	Princesa de Asturias	6389	347¾	61	21¾	15,000	Carraca	. 1896	..	600,000	12–10	2	..	12	10½	..	2 11-in., 10 5·5-in., 2 2·7-in., 4 2·2-in., 4 1·4-in., 2 M.	5	20·0	1200	500

SPAIN.—Cruising Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	ins.				knots.	tons.	
cr.	Alfonso XII . . .	3041	278¾	42½	16½	4800	Ferrol .	1887	1890	..	..	..	6 6·2-in. (Hontoria), 2 2·7-in., 6 6-pr., 4 3-pr., 5 M.	5	17·5 t	600	300
g.b.	General Concha . .	515	157½	25½	8½	600	Ferrol .	1883	1884	..	..	..	3 4·7-in. (Hontoria), 2 Q.F., 1 M. .	1	11·0	80	93
cr.	Conde de Venadito .	1112	210	32	12½	1600	Cartagena	1888	1890	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 2 Q.F., 5 M.	2	14·0	220	130
to.g.b.	Don Alvaro de Bazán .	810	233	26¾	22	2500	Ferrol .	1897	1899	..	..	..	2 4·7-in. (Hontoria), 4 1·6-in., 2 M.	4	19·0	..	110
„	Doña María de Molina .	810	233	26¾	22	2500	Ferrol .	1896	1898								
„	Destructor . . .	458	192½	25	7	3800	Clydebank	1887	1888	..	..	..	1 3·5-in., 4 6-pr., 4 M. . .	3	22·56 t	104	55
cr.	Extremadura . . .	2030	290	36	14	7000 T	Cadiz .	1900	1902	..	2	..	8 4-in. (Vickers), 4 2·2-in., 2 1·4-in., 1 l.	..	20·0	..	..
sl.	Infanta Isabel . . .	1112	211	32¼	12½	1500	Cadiz .	1885	1887	..	..	..	4 4·7-in. (Hontoria), 2 2·7-in., 3 Q.F., 4 M.	2	14·0	220	130
„	Isabel II	1112	211	32¼	12½	1500	Ferrol .	1886	1888								
cr.	Lepanto	4750	318½	50½	20	12,000	Cartagena	1892	1895	..	4¾	..	4 7·8-in. (Hontoria), 6 4·7-in., 6 6-pr., 4 3-pr., 5 M.	5	20·0	1100	276

SPAIN.—Cruising Ships—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	ins.	ins.			knots.	tons.	
to.g.b.	Marqués de la Victoria	810	233	26¾	22	2500	Ferrol	1897	1900	..	..	..	2 4·7-*in.* (Hontoria), 4 1·6-*in.*, 2 M.	4	19·0	..	110
g.v.	Marqués de Molins	562	190	23	10¼	2600	Ferrol	1891	1893	..	..	..	2 4·7-*in.* (Hontoria), 4 2·2-*in.*, 1 M.	2	12·0	106	80
,,	Martin Alonso Pinzón							1892	1893								
,,	Nueva España	620	190	23	11¾	2600	Carraca	1889	1890	..	..	..	2 4·7-*in.* (Hontoria), 4 2 2-*in.*	2	14·0	106	91
cr.	Reina Regente	5287	337	529	19¾	6500 W.T.	Ferrol	Bldg.	..	..	..	3	10 5·5-*in.*, 12 2·2-*in.*, 2 1., 8 M.	3	20·0	..	..
,,	Rio de la Plata . shd.	1773	246	35½	15	7100 N.S.	Havre	1893	1899	..	..	1	2 5·5-*in.*, 4 3·9-*in.*, 4 2·2-*in.*, 6 M.	2	20·0	270	213
g.v.	Temerario	562	190	23	10¼	2600	..	1889	1890	..	..	..	2 4·7-*in.* (Hontoria), 4 2·2-*in.*, 1 M.	2	15·0	106	82
,,	Vincente Yáñez Pinzón	562	190	23	10¼	2600	Ferrol	1891	1892	..	..	..	2 4·7-*in.* (Hontoria), 4 2·2-*in.*, 1 M.	2	12·0	106	80

Hernán Cortés, Vasco Nuñez de Balboa, Ponce de Léon, MacMahon, Perla gunboats; Asturias, Nautilus, Bilbao, Gen. Vales, training ships; Urania, hydrographic service; Giralda, royal yacht.

SWEDEN.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Deck.	Side above Belt.	Bulkhead.	Gun Position. Heavy Guns.	Secondary.	Armament. Guns.	Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
c.d.s.,t	Aeran	3612	287	49¼	16½	6500 Y.	Gothenburg	1901	1902	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 8·2-in., 6 5·9-in., 10 2·2-in., 2 1·4-in., 2 M.	2 sub.	17·2 t	370	250
"	Dristigheten	3445	285	48½	16	5400 Y.	Gothenburg	1900	1901	..	8 K.S.	1⅞	..	..	8 N.S.	3¾ K.S.	2 8·2-in., 6 5·9-in., 10 2·2-in., 2 M.	2 sub.	16·5	300	..
a.c.	Fylgia, Unnamed	4100	377¼	48¾	16	12,000 Y.	Stockholm	Bldg.	..	385,700	4 K.S.	2	..	..	4 K.S.	..	8 5·9-in., 14 2·2-in.	2	21·5	350/900	350
c.d.s., t.	Göta	3238	258½	48	16¾	4750	Gothenburg	1890 1902	1891	..	11¾–8	2	..	..	7½ H.S.	5 H.S.	2 10-in., 4 6-in., 5 2·2-in., 8 M.	3	16·0	240	150
"	Manligheten	3612	287	49¼	16½	7400 Y.	Malmö	1904	..	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 8·2-in., 6 5·9-in., 10 2·2-in., 2 1·4-in., 2 M.	2 sub.	17	370	250
"	Njord	3445	278¼	48½	17½	5350	Gothenburg	1898	1899	..	9½ H.N.S.	1⅞	..	..	9⅞ H.N.S.	3¾ H.N.S.	2 9·8-in., 6 4·7-in., 10 2·2-in., 4 M.	1	16·5	275	200
"	Oden	3445	278¼	48½	17½	5330	Stockholm	1896	1898	..	9½ H.N.S.	1⅞	..	..	9⅞ H.N.S.	3¾ H.N.S.	2 9·8-in., 4 4·7-in., 10 2·2 in., 4 M.	1	16·5	275	200
"	Oskar II	4203	313¾	49½	16¾	8500 Y.	Gothenburg	Bldg.	..	..	6 K.S.	2	6 K.S.	6 K.S.	7½ K.S.	5 K.S.	2 8·2-in., 8 5·9-in., 10 2·2-in., 2 1·4-in., 2 M.	2 sub.	18·0	350/500	326
"	Svea	3051	248¼	49¼	17	3640	Gothenburg	1886 1904	1887	..	11¾–8	2	..	..	11½	..	2 10-in. (A.), 4 4·7-in., 6 2·2-in., 8 M.	1	14·7 t	220	268
"	Tapperheten	3612	287¼	49¼	16½	6000 Y.	Malmö	1901	1904	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 8·2-in., 6 5·9-in., 10 2·2-in., 2 1·4-in., 2 M.	2 sub.	16·5	370	250
"	Thor	3445	278¼	48½	17½	5350	Stockholm	1898	1890	..	9½ H.N.S.	1⅞	..	..	9⅞ H.N.S.	3¾ H.N.S.	2 9·8-in., 6 4·7-in., 10 2·2-in., 4 M.	1	16·5	275	200
"	Thule	3248	260¾	48	16¾	4740	Stockholm	1892 1904	1894	..	11¾–8	1⅞	..	..	11½	..	2 10-in.(A.), 4 6-in., 5 2·2-in., 8 M.	2	16·2 t	250	165
"	Wasa	3612	287	49¼	16½	6000 Y.	Stockholm	1901	1893	..	7 K.S.	1⅞	..	..	7½ K.S.	5 K.S.	2 8·2-in., 6 5·9-in., 10 2·2-in., 2 1·4-in., 2 M.	2 sub.	16·5	370	250

The old coast-defence ships John Ericsson, Thordön, and Tirfing, 1500 tons, Loke, 1600 tons, and the armoured gunboats Berserk, Björn, Folke, Gerda, Hildur, Sölve and Ulf, 460 tons. Some of these are being partially modernized.

SWEDEN.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.										knots.	tons.	
to.g.b.	Claes Horn	787	222	27	10¼	3600	Stockholm	1899	1900	..	..	..	2 4·7-in., 4 2·2-in.	1 sub.	20·0	..	100
”	Claes Uggla	787	232	27¼	8¾	4500 Y.	Stockholm	1900	1901	..	..	..	2 4·7-in., 4 2·2-in.	1 sub.	20·5	..	100
tor. ship.	Drott (ex Ran)	539	175¼	26	9¾	960	Stockholm	1877	1878	..	..	..	4 Engström Q.F.	1	13·0	100	..
g.v.	Edda	549	183¾	27	10¼	960	Carlskrona	1885	1886	..	..	..	1 10·6-in., 1 6-in., 2 1·5-in., 2 M.	..	13·6 t	80	76
corv.	Freja	1968	216	40	19¾	1750	Malmö	1885	1887	..	..	..	4 6-in., 8 4·7-in., 4 1·5-in., 2 2·5-in., 5 M.	..	14·1 t	180	250
to.g.b.	Jacob Bagge	787	222	27	10¼	3970	Malmö	1898	1899	..	..	..	2 4·7-in., 4 2·2-in.	1 sub.	19·5	..	100
”	Örnen	787	222	27	10¼	4100	Gothenburg	1896	1897	..	..	..	2 4·7-in., 4 2·2-in.	1 sub.	19·5	..	100
”	Psilander	787	232	27¼	8¾	4500 Y.	Stockholm	1900	1901	..	..	..	2 4·7-in., 4 2·2-in.	1 sub.	20·5 t	..	100
g.v.	Rota	527	171¼	25¼	10¾	780	Stockholm	1878	1879	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	13·0	80	72
”	Skäggald	527	171¼	26	9¾	780	Stockholm	1879	1880	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	13·2 t	80	72
”	Skagul	527	171½	25½	10¼	780	Stockholm	1878	1879	..	..	..	1 6-in., 1 4·7-in., 2 2·2-in., 2 M.	..	13·1 t	80	72
”	Skuld	527	171¼	25¼	10¾	780	Carlskrona	1879	1880	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	13·0	80	72
”	Urd	527	172¼	25½	10½	780	Malmö	1877	1878	..	..	..	1 6-in., 1 4·7-in., 2 2·2-in., 2 M.	..	13·5 t	80	71
”	Verdande	527	171½	25½	10¼	780	Carlskrona	1879	1880	..	..	..	1 10·6-in., 1 4·7-in., 2 M.	..	13·2 t	80	72

Old gun vessel of 500 tons, four gunboats of 190 to 200 tons, and about 130 I.H.P. each, and carrying 1 5-in. B.L.R. and 2 M.; also one vessel of 280 tons and 440 H.P., armed with 4 Q.F. guns—the Svenskund, used as a mining and torpedo-ship and ice-breaker.

TURKEY.—Armoured Ships.

A number of ships have been struck out of these lists owing to information obtained from Constantinople. Of the remainder few have any fighting value.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour. Belt.	Armour. Deck.	Armour. Side above Belt.	Armour. Bulkhead.	Armour. Gun Position. Heavy Guns.	Armour. Gun Position. Secondary.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Coal	Complement.
		tons.	ft.	ft.	ft.						in.	in.	in.	in.	in.	in.			knots.	tons.	
c.	Assar-i-Shefket	2047	203½	42½	16½	1750	La Seyne	1868	1870	..	6	..	..	..	5	..	1 9-in. (A.), 4 7-in., 4 M., 4 l.	..	11·0	375	220
c.b.	Assar-i-Tewfik	4613	272¼	52½	25	3560	La Seyne	1868	1870	..	8	..	..	..	6	..	2 9·2-in., 6 6-in., 10 12-pr., 12 6-pr.	..	13·0	400	..
c.	Avni-Illah	2400	226¼	36	16½	2200	Thames	1869	1871	..	6	1½	..	..	6	..	4 9-in. M.L.R. (A.), 4 M., 4 l.	1	12·0	220	225
b.	Azizieh *	6400	292	55¾	25½	3735	Clyde	1864	1865	..	5½	..	5	..	4½	5	2 9·2-in. (K.), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	13·0	750	600
c.b.	Feth-i-Bulend	2720	236¼	39¼	18	3250	Thames	1869	1870	..	9	5	..	..	9	..	4 9-in. M.L.R. (A.), 4 M., 4 l.	1	13·0	300	250
,,	Hamidieh	6700	292	55¾	24¾	4500	Turkey	1885	1893	..	9	3	5	..	5	..	10 10·2-in. (K.), 2 6·6-in., 6 l., 2 M.	2	13·0	600	..
b.	Mahmoudieh *	6400	292	55¾	25½	3735	Thames	1864	1866	..	5½	..	5	..	4½	5	2 9·2-in. (K.), 8 8·2-in., 6 3·9 in., 7 M., 2 l.	2	12·0	750	600
c.b.	Messoudieh	9120	331½	59	25¾	11,000 Nic.	Thames. Genoa	1874 1901	1876	..	12	1	12	..	6–9	12	2 9·2-in., 12 6-in., 14 3-in., 10 6 pr., 2 3-pr., 2 l.	..	17·5 t	600	..
,,	Muin-i-Zaffer	2400	230	36	16½	2200	Thames	1869	1870	..	6	1½	..	..	6	..	4 10-in. M.L.R. (A.), 1 4·7-in. (K.), 4 M., 4 l.	1	12·0	220	..
,,	Mukadim-i-Hair	2720	236¼	39¼	18	3000	Turkey	1872	1874	..	9	5	..	..	9	..	4 10-in. M.L.R. (A.), 1 4·7-in. (K.), 4 M., 4 l.	1	12·0	300	250
,,	Nedjim-i-Schefket	2018	203½	42½	16½	1900	La Seyne	1868	1870	..	6	..	..	..	5	..	1 9-in., 4 7-in. (A.), 4 M., 4 l.	1	11·0	300	220
b.	Orkanieh *	6400	292	55¾	25½	3735	Clyde	1865	1870	..	5½	..	5	..	4½	5	2 9·2-in. (K.), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600
,,	Osmanieh *	6400	292	55¾	25½	3735	Clyde	1864	1869	..	5½	..	5	..	4½	5	2 9·2-in. (K.), 8 8·2-in., 6 3·9-in., 7 M., 2 l.	2	12·0	750	600

* It is stated that these vessels are to be reconstructed on the Golden Horn by Messrs. Ansaldo.

TURKEY.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Coal.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
cr.	Abdul Hamid	3800	340	47½	16	12,500 Nic.	Elswick	1903	1904	..	4–1½	..	2 *6-in.*, 8 *4·7-in.*, 6 *1·8-in.*, 6 M.	2	22·2 *t*	600	300
"	Abdul Medjidieh	3432	331¼	42	16	12,000 Nic.	Philadelphia	1903	1904	..	4–1½	..	2 *6-in.*, 8 *4·7-in.*, 6 *1·8-in.*, 6 M.	2	22·2	600	300
"	Fezibahri	1815	226	35	14	2500	Turkey	Bldg.	..	..	½	..	6 *6-in.* (K.)	7	17·0	..	..
"	Heibetnuma	1960	226	37	14	2500 ind.	Turkey	1890	1893	..	..	..	3 *6·6-in.* (K.), 6 *4·7-in.*, 6 Q.F.	2	14·0	..	..
"	Hundavendikiar	4050	279	49¼	21	..	Turkey	Bldg.	..	..	2	..	2 *8·9-in.* (K.), 6 *5·9-in.*, 4 *3·9-in.*	5	..	..	300
g.v.	Lutfi-Hamayoun	1313	210	35	14	2800	Turkey	1892	1894	..	..	..	4 *6-in.* (K.), 6 *4·7-in.*, 6 Q.F.	2	13·0	..	..
to. g.b.	Namet	900	230	31	16½	4500	Gaarden	1890	1891	..	..	¼	2 *4-in.* (K.), 16 M.	2	19·0	..	111
"	Pelenk-i-deria	840	236¼	31	16½	5000	Gaarden	1890	1891	..	..	¼	2 *4-in.* (K.), 16 M.	2	20·0	..	111
g.v.	Sedul Bahr	800	173½	26½	11½	160	Turkey	1894	1897	..	2	..	4 *4·7-in.* (K.), 6 M.	2	12·7	120	..
cr.	Selimieh	4050	279	49¼	21	..	Turkey	Bldg.	..	..	½	..	2 *8·2-in.* (K.), 6 *5·9-in.*, 4 *4-in.*, 6 M.	..	..	..	300
"	Shadie	1815	226	35	14	2500	Turkey	Bldg.	..	..	..	..	6 *5·9-in.* (K.)	7	17·0	..	..
to. g.b.	Shahani-deria	450	200	23	9	3000	Turkey	1892	1894	..	..	..	2 *4·7-in.* (K.), 6 M.	4	22·0	..	..
g.v.	Zuhaf	800	173½	26½	11½	160	Turkey	1894	1896	..	..	..	4 *4·7-in.* (K.), 6 M.	2	12·7	120	..

UNITED STATES.—Armoured Ships.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Ind'cated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. *	Armour.				Gun Position.		Armament.		Speed.	Coal.	Complement.
											Belt.	Deck.	Side above Belt.	Bulkhead.	Heavy Guns.	Second-ary.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.	in.	in.	in.	in.			knots.	tons.	
t.	Alabama	11,565	368	72¼	26	11,366 *t*	Philadelphia	1898	1900	544,539	16½–4 H.S.	2¾–4	5¼ H.S.	12 H.S.	15 H.S.	6 H.S.	4 *13-in.*, 14 *6-in.*, 16 *6-pr.*, 8 *1-pr.*, 4 M., 2 l.	4	17·1 *t*	800 1200	592
c.d.s., t. (2 t.)	Amphitrite	3990	259½	55½	14¾	1600	Wilmington	1883 reblt.	1895	..	9–5 N.S.	1¾	..	..	11½ N.S.	..	4 *10-in.*, 2 *4-in.*, 2 *6-pr.*, 2 *3-pr.*, 8 *1-pr.*, 3 M., 1 l.	..	10·5	250	182
c.d.s., t. (1 t.)	Arkansas	3235	252	50	12¾	1829 T.	Newport News	1900	1902	197,267	11–5 H.S.	1½	..	..	11 H.S.	..	2 *12-in.*, 4 *4-in.*, 3 *6-pr.*, 6 *1-pr.*, 2 M.	..	12·0 *t*	400	148
a. c.	Brooklyn.	9215	400½	62	26¼	18,769	Philadelphia	1895	1896	613,583	3 H.S.	6–3	4 H.S.	..	8 H.S.	5½ H.S.	8 *8-in.*, 12 *5-in.*, 12 *6-pr.*, 4 *1-pr.*, 4 M., 2 l.	..	21·9 *t*	900 1622	718
,,	California	13,680	502	69½	24½	23,000 B. & W.	S. Francisco	1904	..	756,000	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2	22·0	900 2000	829
,,	Charleston	9700	424	66	25½	21,000 B.&W.	Newport News	1904	..	563,030	4 H.S.	3	4 H.S.	..	4 H.S.	..	14 *6-in.*, 18 *14-pr.*, 12 *3-pr.*, 12 *1-pr.*, 10 M., 2 l.	..	22·0	650 1500	664
,,	Colorado.	13,680	502	69½	24½	23,000 Nic.	Philadelphia	1903	..	756,000	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2	22·3 *t*	900 2000	829
t.	Connecticut	16,000	450	76¾	26¾	16.500 B. & W.	New York	1904	..	819,300	11½ K.S.	3	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	..	18·0	900 2200	803
c.d.s., t. (1 t.)	Florida	3235	252	50	12¾	2400 Nor.	Elizabeth-port	1901	1903	190,075	11–5 H.S.	1½	..	..	11 H.S.	..	2 *12-in.*, 4 *4-in.*, 3 *6-pr.*, 6 *1-pr.*, 2 M.	..	12·4 *t*	355	171
Super-posed turrets.	Georgia	14,948	435	76¼	23¾ †	19,000 Nic.	Bath, Me.	1904	..	737,700	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2	19·0	900 1704	812
b.	Idaho	13,000	375	77	27	10,000 W.T.	Philadelphia	Bldg.	..	616,360	9–4 K.S.	..	7 K.S.	7 K.S.	12–8 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 10 *7-in.*, 12 *3-in.*, 6 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	2 sub.	17·0	600 1750	..
t.	Illinois	11,565	368	72¼	26	12,898	Newport News	1898	1901	533,237	16½–4 H.S.	2¾–4	5¼ H.S.	12 H.S.	15 H.S.	6 H.S.	4 *13-in.*, 14 *6-in.*, 16 *6-pr.*, 6 *1-pr.*, 4 M., 2 l.	4	17·45 *t*	800 1400	686
b.	Indiana	10,288	348	69¼	27½	9,738	Philadelphia	1893	1895	620,569	18 H.S.	2¾	5 H.S.	17 H.S.	17 H.S.	10 H.S.	4 *13-in.*, 8 *8-in.*, 4 *6-in.*, 20 *6-pr.*, 6 *1-pr.*, 3 l.	2	15·5 *t*	400 1567	497
,,	Iowa	11,340	360	72¼	26¾	12,105	Philadelphia	1896	1897	618,514	14 H.S.	2¾	5 H.S.	12 H.S.	15 H.S.	8–6 H.S.	4 *12-in.*, 8 *8-in.*, 6 *4-in.*, 20 *6-pr.*, 4 *1-pr.*, 4 M., 2 l.	4	17·1 *t*	625 1795	520

* The sums given in this column are exclusive of the cost of armour and armament, according to the system of making appropriations in the estimates.   † Mean draught.

UNITED STATES.—Armoured Ships—*continued.*

Class.	NAME.	Displacement. (tons.)	Length. (ft.)	Beam. (ft.)	Draught. (ft.)	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. * (£)	Armour: Belt. (in.)	Armour: Deck. (in.)	Armour: Side above Belt (in.)	Armour: Bulkhead. (in.)	Gun Position: Heavy Guns. (in.)	Gun Position: Secondary. (in.)	Armament: Guns.	Torpedo Tubes.	Speed (knots.)	Normal Coal Supply.† (tons.)	Complement.
t.	Kansas	16,000	450	77	26¾	16,500 B. & W.	Camden, N.J.	Bldg.	..	855,850	8–11 K.S.	3–4½	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	..	18·0	900 / 2200	854
ram	Katahdin	2155	250¾	43½	16	5,068	Bath, Me.	1893	1896	191,102	6–3 H.S.	2–6	..	..	18 con. tr. H.S.	..	4 *6-pr.*	..	16·1 *t*	175 / 192	97
super-posed turrets	Kearsarge / Kentucky	11,540	368	72¼	25¾	11,954 / 12,318	Newport News.	1898	1900	462,345 each	16½–4 H.S.	2¾–5	5½ H.S.	..	15 H.S.	9 H.S.	4 *13-in.*, 4 *8-in.*, 14 *5-in.*, 20 *6-pr.*, 8 *1-pr.*, 4 M., 2 l.	4	16·8 *t*	410 / 1591	650 / 613
t.	Louisiana	16,000	450	76¾	26¾	16,500 B. & W.	Newport News.	1904	..	819,300	11–8 K.S.	3	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 L.	..	18·0	900 / 2200	803
,,	Maine	12,300	388	72¼	25½	15,840 Nic.	Philadelphia	1901	1902	592,828	11–4 K.S.	2¾–4	6 K.S.	10 K.S.	12 K.S.	6 K.S.	4 *12-in.*, 16 *6-in.*, 6 *3-in.*, 8 *3-pr.*, 6 *1-pr.*, 2 M., 2 l.	2 sub.	18·0 *t*	1000 / 1800	551
a.c.	Maryland	13,680	502	69½	24½	23,000 B. & W.	Newport News.	1903	..	756,400	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·4 *t*	900 / 1850	829
b.	Massachusetts	10,288	348	69¼	27⅓	10,415	Philadelphia	1893	1896	620,569	18 H.S.	2¾	5 H.S.	17 H.S.	17 H.S.	10–5 H.S.	4 *13-in.*, 8 *8-in.*, 4 *6-in.*, 20 *6-pr.*, 8 *1-pr.*, 2 M., 2 l.	2	16·2 *t*	400 / 1560	509
c.d.s., t. (2 t.)	Miantonomoh	3990	259½	55¼	15	1,426	Chester	1876 reblt.	1891	..	7–4 *comp.*	1¾	..	..	11½ *comp.*	..	4 *10-in.*, 2 *6-pr.*, 2 *3-pr.*, 4 *1-pr.*, 1 M.	..	10·5	250	149
a.c.	Milwaukee	9700	424	66	25½	21,000 W.T.	S. Francisco.	1904	..	580,500	4 H.N.S.	3	4 H.N.S.	..	4 H.N.S.	..	14 *6-in.*, 18 *14-pr.*, 12 *3-pr.*, 12 *1-pr.*, 10 M., 2 l.	..	22·0	650 / 1500	664
t.	Minnesota	16,000	450	77	26¾	16,500	Newport News	Bldg.	..	814,500	8–11 K.S.	3–4½	8 K.S.	7 K.S.	[illegible] K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	..	18·0	900 / 2200	..
b.	Mississippi	13,000	375	77	27	10,000 W.T.	Philadelphia	Bldg.	..	616,360	9–4 K.S.	..	7 K.S.	7 K.S.	12–8 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 10 *7-in.*, 12 *3-in.*, 6 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	2 sub.	17·0	600 / 1750	..
t.	Missouri	12,300	388	72¼	25½	16,000 T.	Newport News	1901	1903	592,828	12–4 K.S.	2¾–4	6 K.S.	10 K.S.	12 K.S.	6 K.S.	4 *12-in.*, 16 *6-in.*, 6 *3-in.*, 8 *3-pr.*, 6 *1-pr.*, 2 M., 2 l.	2 sub.	18·0	1000 / 1836	551
c.d.s., t. (2 t.)	Monadnock	3990	259½	55½	14½	3,000	Vallejo, Cal.	1883 reblt.	1896	..	5–9 H.S.	1¾	..	..	11½ H.S.	..	4 *10-in.*, 2 *4-in.*, 2 *6-pr.*, 2 *3-pr.*, 2 *1-pr.*, 2 M.	..	12·0	250 / 386	213
a.c.	Montana	14,500	502	72¾	25	25,000 B. & W.	Newport News	Bldg.	..	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	4 sub.	22·0	900 / 2000	845
c.d.s., t.	Monterey	4084	256	59	15¼	5244	S. Francisco.	1891	1893	345,73[illegible]	13–6 H.S.	3	..	..	13 H.S.	..	2 *12-in.*, 2 *10-in.*, 6 *6-pr.*, 4 *1-pr.*, 2 M.	..	13·6 *t*	200 / 233	218
Super-posed turrets.	Nebraska	14,948	435	76½	23¾ †	19,000 B. & W.	Seattle.	1904	..	767,210	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	19·0	900 / 1900	812
c.d.s., t. (1 t.)	Nevada	3714	252	50	12¾	2,400 Nic.	Bath, Me.	1900	1903	197,267	11–5 H.S.	1½	..	..	11 H.S.	..	2 *12-in.*, 4 *4-in.*, 3 *6-pr.*, 6 *1-pr.*, 2 M.	..	13·0 *t*	338	148
t.	New Hampshire	16,000	450	77	26¾	16,500 B. & W.	New York Shipbldg. Co.	Bldg.	..	1,600,000 (Total)	9–4 K.S.	3	7 K.S.	7 K.S.	12 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	..	18·0	900 / 2350	916
Super-posed turrets.	New Jersey	14,948	435	76½	23¾ †	19,000 B. & W.	Quincy, Mass.	1904	..	699,680	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	19·0	900 / 1900	812
a.c.	New York	8200	380½	64¾	27¼	17,401	Philadelphia	1891	1893	613,377	4 H.S.	6–3	..	..	10 H.S.	5–¼4 H.S.	6 *8-in.*, 12 *4-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 2 l.	2	21·0 *t*	750 / 1334	498
,,	North Carolina	14,500	502	72¾	25	25,000 B. & W.	Newport News	Bldg.	..	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 4 M., 2 l.	4 sub.	22·0	900 / 2000	845
t.	Ohio	12,440	388	72¼	25½	15,100 T.	S. Francisco.	1901	1904	595,705	11–4 K.S.	3–4	6 K.S.	10 K.S.	12 K.S.	6 K.S.	4 *12-in.*, 16 *6-in.*, 6 *3-in.*, 8 *3-pr.*, 6 *1-pr.*, 2 M., 2 l.	2 sub.	17·9 *t*	1000 / 2144	521
b.	Oregon	10,288	348	69¼	27¼	11,111	S. Francisco.	1893	1896	653,447	18 H.S.	2¾	5 H.S.	17 H.S.	17 H.S.	10–5 H.S.	4 *13-in.*, 8 *8-in.*, 4 *6-in.*, 20 *6-pr.*, 6 *1-pr.*, 4 M., 1 l.	2	16·8 *t*	400 / 1594	500
a.c.	Pennsylvania	13,680	502	69½	24½	23,000 Nic.	Philadelphia	1903	..	799,340	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·4 *t*	900 / 2000	829
c.d.s., t. (2 t.)	Puritan	6060	290¼	60	18½	3,700	Chester	1882 reblt.	1896	..	14–6 H.S.	2	..	..	14 H.S.	..	4 *12-in.*, 4 *4-in.*, 6 *6-pr.*, 4 *3-pr.*, 6 *1-pr.*, 4 M.	..	12·4 *t*	307	230
Super-posed turrets.	Rhode Island	14,948	435	76¼	23¾ †	19,000 B. & W.	Quincy, Mass.	1904	..	699,680	11–4 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	19·0	900 / 1900	812
a.c.	St. Louis	9700	424	66	25½	21,000 B. & W.	Philadelphia (Neafie)	1904	..	563,030	4 K.S.	3	4–3	..	4 K.S.	..	14 *6-in.*, 18 *14-pr.*, 12 *3-pr.*, 12 *1-pr.*, 10 M., 2 l.	..	22·0	650 / 1500	664
,,	South Dakota	13,680	502	69½	24½	23,000 B. & W.	S. Francisco.	Bldg.	..	770,570	6–3½ K.S.	4	5 K.S.	4 K.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·0	900 / 2000	829
,,	Tennessee	14,500	502	72¾	27	23,000 B. & W.	Philadelphia	1904	..	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	4 sub.	22·0	900 / 2000	858
c.d.s., t. (2 t.)	Terror	3990	259½	55½	15¼	1,600	Philadelphia	1883 reblt.	1896	737,700	7–4 N.S.	1¾	..	..	11½ N.S.	..	4 *10-in.*, 4 *4-in.*, 2 *6-pr.*, 2 *3-pr.*, 2 *1-pr.*, 2 M.	..	10·5	250 / 285	443
t.	Texas	6315	301¼	64	25¼	8,610	Norfolk	1892	1895	513,716	12 N.S.	2	..	12 N.S.	12 N.S.	..	2 *12-in.*, 6 *6-in.*, 12 *6-pr.*, 10 *1-pr.*, 6 M., 1 l.	2	17·8 *t*	500 / 845	428
t.	Vermont	16,000	450	77	26¾	16,500 B. & W.	Quincy, Mass.	Bldg.	..	858,730	8–11 K.S.	3–4½	8 K.S.	7 K.S.	10 K.S.	7 K.S.	4 *12-in.*, 8 *8-in.*, 12 *7-in.*, 20 *14-pr.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	..	18·0	900 / 2200	854
Super-posed turrets	Virginia	14,948	435	76½	23¾ †	19,000 Nic.	Newport News	1904	..	737,700	11–8 K.S.	3	6 K.S.	6 K.S.	11 K.S.	6 K.S.	4 *12-in.*, 8 *8-in.*, 12 *6-in.*, 12 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	19·0	900 / 1900	812
a.c.	Washington	14,500	502	72¾	27	25,000 B. & W.	Camden, N.J.	1905	..	970,630‡	5–3 K.S.	3	5 K.S.	6 K.S.	9 K.S.	5 K.S.	4 *10-in.*, 16 *6-in.*, 22 *3-in.*, 12 *3-pr.*, 4 *1-pr.*, 8 M., 2 l.	4 sub.	22·0	900 / 2000	858
,,	West Virginia	13,680	502	69½	24½	23,000 B. & W.	Newport News	1903	..	798,310	6–3½ K.S.	4	5 K.S.	12 H.S.	6 K.S.	5 K.S.	4 *8-in.*, 14 *6-in.*, 18 *3-in.*, 12 *3-pr.*, 8 *1-pr.*, 8 M., 2 l.	2 sub.	22·1 *t*	900 / 2000	829
t.	Wisconsin	11,653	368	72¼	26	12,609	S. Francisco.	1898	1901	549,666	16½–4 H.S.	3–4	5½ H.S.	..	15 H.S.	6 H.S.	4 *13-in.*, 14 *6-in.*, 16 *6-pr.*, 6 *1-pr.*, 4 M., 2 l.	4	17·1 *t*	800 / 1310	583
c.d.s., t. (1 t.)	Wyoming	3218	252	50	12¾	2,451 B. & W.	S. Francisco.	1900	1903	200,350	11–5	1½	..	..	11	..	2 *12-in.*, 4 *4-in.*, 3 *6-pr.*, 6 *1-pr.*, 2 M.	..	12·4 *t*	881	175

* See note on previous page. † Mean draught. ‡ Including armour, but not armament.

The Naval Appropriation Act, 1905, provides for laying down two battleships.

UNITED STATES.—Cruising Ships, &c.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost. †	Armour. Deck.	Armour. Gun Position.	Armament. Guns.	Armament. Torpedo Tubes.	Speed.	Normal Coal Supply.	Complement
		tons.	ft.	ft.	ft.					£	in.	in			knots.	tons.	
cr.	Albany . shd.	3487	345	43¾	20	7500	Elswick	1899	1900	247,611	3	3–1½ shields	5 6-in., 11 5-in., 4 4·7-in., 10 6-pr., 8 1-pr., 2 M.	3	20·5 t	512 / 747	356
g.b.	Annapolis	1000	168	36	12½	1227 B.&W.	Elizabeth Pt.	1896	1897	46,789	..	..	6 4-in., 4 6-pr., 2 1-pr., 1 M.	..	13·1 t	100 / 225	135
cr.	Atlanta	3000	271¼	42¼	20½	4030 C. & B.&W.	Chester	1884	1886	126,785	1½	..	2 8-in., 6 6-in., 6 6-pr., 4 1-pr., 2 M.	..	15·6 t	382 / 573	304
,,	Baltimore	4413	327½	48½	24	10,064	Philadelphia	1888	1890	272,270	4–2½	4½ shield	12 6-in., 6 3-in., 6 3-pr., 4 1-pr., 5 M., 1 l.	5	20·1 t	709 / 1064	383
g.v.	Bancroft	839	187½	32	13	1213	Elizabeth Pt.	1892	1893	51,371	½	..	4 4-in., 8 3-pr., 1 1-pr., 1 M.	1	14·37 t	100 / 136	195
,,	Bennington	1710	230	36	16½	3392	Chester	1890	1891	100,894	½	..	6 6-in., 4 6-pr., 4 1-pr., 4 M.	..	17·5 t	200 / 403	195
scout	Birmingham	3750	420	46¾	17	16,000 W.T.	..	Bldg.	..	..	2–1½	..	12 3-in.	2 sub.	24·0	1250	384
cr.	Boston	3000	271¼	42¼	20½	4030	Chester	1884	1887	127,196	1½	..	2 8-in., 6 6-in., 6 6-pr., 4 1-pr., 2 M., 1 l.	..	15·6 t	380 / 456	282
g.v.	Castine	1177	204	32	14¼	2199	Bath, Me.	1892	1894	65,450	½	..	8 4-in., 4 6-pr., 2 1-pr., 1 M.	..	16·0	125 / 292	151
cr.	Chattanooga shd.	3200	292	44	16¾	4500 B.&W.	Elizabeth Pt.	1903	1904	212,325	2	..	10 5-in., 8 6-pr., 2 1-pr., 4 M., 1 l.	..	16·5 t	470 / 700	302
scout	Chester	3750	420	46¾	17	16,000 W.T.	..	Bldg.	..	..	2–1½	..	12 3-in.	2 sub.	24	1250	384
cr.	Chicago	5273	325	48¼	22½	9000 C. & B.&W.	Chester	1885	1889	182,677	1½	4 shield	4 8-in., 14 5-in., 9 6-pr., 2 1-pr., 2 M., 1 l.	..	18·0	831	409
,,	Cincinnati	3213	300	42	20¼	8,490 B.&W.	Brooklyn	1892	1894	226,055	2½	4	11 5-in., 8 6-pr., 2 1-pr., 2 M.	2	19·0	350 / 468	314
,,	Cleveland . shd.	3200	292	44	16¾	4500 B.&W.	Bath, Me.	1901	1903	212,325	2	..	10 5-in., 8 6-pr., 2 1-pr., 4 M., 1 l.	..	16·4 t	470 / 700	302
,,	Columbia	7375	412	58¼	25½	18,509	Philadelphia	1892	1894	559,950	4–2½	4 shield	1 8-in., 2 6-in., 8 4-in., 12 6-pr., 2 1-pr., 2 M., 1 l.	4	22·8 t	750 / 1670	477
g.v.	Concord	1710	230	36	16½	3404	Chester	1890	1891	100,894	½	..	6 6-in., 2 6-pr., 2 3-pr., 2 1-pr.	..	16·8 t	200 / 401	194
cr.	Detroit	2089	257	37	16¾	5227	Baltimore	1891	1893	125,860	½	..	10 5-in., 6 6-pr., 2 1-pr., 2 M., 1 l.	2	18·71 t	200	256
,, ,,	Denver / Des Moines shd.	3200	292	44	16¾	4500 B. & W.	Philadelphia / Quincy, Mass.	1902	1904	212,325	2	..	10 5-in., 8 6-pr., 2 1-pr., 4 M., 1 l.	..	16·5	470 / 700	308
g.v.	Dolphin	1486	240	32	17	2255	Chester	1884	1885	64,728	..	..	2 4-in., 1 6-pr., 6 3-pr., 2 M.	..	15·5 t	173	117
,,	Don Juan de Austria*	1159	210	32	13	1500	Cartagena	1889	1892	..	..	..	4 5-in., 4 6-pr., 4 M.	3	14·0	210	130
,,	Dubuque	1085	174	35	13	1000 B. & W.	Morris Heights N.Y.	1904	..	..	..	..	6 4-in., 4 6-pr., 2 1-pr., 2 M.	..	12·0	200	..
cr.	Galveston . shd.	3200	292	44	16¾	4500 B. & W.	Richmond, Va.	1903	1904	212,325	2	..	10 5-in., 8 6-pr., 2 1-pr., 4 M., 1 l.	..	16·5	470 / 700	302
g.v.	Helena	1392	250¾	40	10	1988	Newport News	1896	1897	57,536	½	2½	8 4-in., 4 6-pr., 4 1-pr., 2 M.	..	15·5 t	100 / 300	256
,, ,,	Isla de Cuba* / Isla de Luzon*	1125	192	30	12¼	2627	Elswick	1887	1888	..	2½	..	4 4-in., 4 6-pr., 4 M.	3	14·0	160	160
,,	Machias	1177	204	32	14¼	2046	Bath, Me.	1891	1893	65,450	½	..	8 4-in., 4 6-pr., 2 1-pr., 2 M.	..	15·46 t	125 / 292	151
cr.	Marblehead	2089	257	37	16¾	Nor. 5450	Boston	1892	1894	138,498	½	..	10 5-in., 6 6-pr., 2 1-pr., 2 M., 1 l.	2	18·9 t	200 / 340	248
g.b.	Marietta	1000	174	34	13½	1054 B.&W.	S. Francisco	1896	1897	45,823	..	..	6 4-in., 4 6-pr., 2 1-pr., 1 M.	..	13·2 t	100 / 239	140
cr.	Minneapolis	7375	412	58¼	25½	20,862	Philadelphia	1893	1894	552,754	4–2½	4 shield	1 8-in., 2 6-in., 8 4-in., 12 6-pr., 2 1-pr., 2 M., 1 l.	4	23·0 t	750 / 1200	477
,,	Montgomery	2089	257	37	17	5584	Baltimore	1891	1894	125,860	½	..	10 5-in. 6 6-pr., 2 1-pr., 2 M.	2	18·8 t	200 / 340	257
g.v.	Nashville	1371	220	38	12	2536 C. & Y.	Newport News	1895	1897	57,536	½	..	8 4-in., 4 6-pr., 2 1-pr., 2 M.	1	16·7 t	150 / 400	176
cr.	Newark	4098	311½	49¼	22½	8868	Philadelphia	1890	1891	256,437	3–2	2 shield	12 6-in., 6 3-in., 6 3-pr., 4 1-pr., 4 M., 2 l.	..	19·0	400 / 809	384
g.b.	Newport	1000	168	36	13	1009	Bath, Me.	1896	1897	..	..	..	6 4-in., 4 6-pr., 2 1-pr., 1 M.	..	12·2 t	100 / 230	147
cr.	New Orleans shd.	3487	346	43¾	19¾	7500	Elswick	1896	1898	293,684	..	3–1½ shields	6 6-in., 4 4·7-in., 10 6-pr., 8 1-pr., 2 M.	..	20·0	512 / 767	366
,,	Olympia	5870	340	53	24¾	17,313	S. Francisco	1892	1895	369,054	4½	4–2½	4 8-in., 10 5-in., 14 6-pr., 4 1-pr., 2 M.	6	21·69 t	400 / 1169	450
g.v.	Paducah	1085	174	35	13	1000 B.&W.	Morris Heights, N.Y.	1904	..	..	..	..	6 4-in., 4 6-pr., 2 1-pr., 2 M.	..	12·0	200	..

* Captured at Manila after the battle of May 1, 1898. The following gunboats were captured during the war with Spain, or subsequently purchased: Albay, Alvarado, Barcelo, Bulusan, Callao, El Cano, Guardoqui, Leyte, Manileño, Mariveles, Mindoro, Pampanga, Panay, Paragua, Quiros, Samar, Sandoval, Urdaneta, Villalobos; also General Alava, transport, 1390 tons.
† Prices exclusive of armament.

UNITED STATES.—Cruising Ships, &c.—*continued.*

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Date of Completion.	Cost.	Armour.		Armament.		Speed.	Normal Coal Supply.	Complement.
											Deck.	Gun Position.	Guns.	Torpedo Tubes.			
		tons.	ft.	ft.	ft.					£	in.	in.			knots.	tons.	
g.v.	Petrel	892	176¼	31	13½	1045	Baltimore	1888	1889	50,755	..	..	4 *6-in.*, 2 *3-pr.*, 4 M.	..	11·8 *t*	100 / 200	122
cr.	Philadelphia	4324	327½	48½	23½	8815	Philadelphia	1889	1890	277,405	4–2½	.. Shields	12 *6-in.*. 4 *6-pr.*, 4 *3-pr.*, 5 *1-pr.*, 4 M., 1 l.	..	19·68 *t*	400 / 1085	384
g.b.	Princeton	1000	168	36	12½	923	Camden	1897	1898	47,262	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	12·0	100 / 238	135
cr.	Raleigh	3213	300	42	20¼	8500 B.&W.	Norfolk	1892	1894	226,055	2½	4	11 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 2 M., 1 l.	2	9·0	350 / 460	313
scout	Salem	3750	420	46¾	18¼	16,000 W. T.	..	Bldg.	..	..	2–1½	..	12 *3-in.*	2 sub.	24·0	1250	384
cr.	San Francisco	4098	310	49¼	22¼	10,604	S. Francisco.	1889	1891	293,435	3–2	2 Shields	12 *6-in.*, 10 *6-pr.*, 4 *1-pr.*, 2 M.	4	19·5	350 / 628	383
,,	Tacoma shd.	3200	292	44	16¾	4500 B.&W.	S. Francisco.	1903	1904	212,325	..	2 Shields	10 *5-in.*, 8 *6-pr.*, 2 *1-pr.*, 4 M., 1 l.	..	16·6 *t*	470 / 700	302
g.v.	Topeka	1700	250	35	..	2200	Kiel	1881	1882	..	..	..	6 *4-in.*, 6 *3-pr.*, 2 *1-pr.*, 1 M.	..	16·0	273 / 410	167
cr.	Vesuvius (Dynamite Gunboat)	929	252¼	26½	11¼	4295	Philadelphia	1888	1890	71,963	..	..	3 *15-in.* dynamite guns, 3 *3-pr.*, 2 M.	..	21·4 *t*	152	69
g.v.	Vicksburg	1000	168	36	12½	1118	Bath, Me.	1896	1898	47,406	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	12·7 *t*	100 / 239	135
,,	Wheeling	1000	174	34	12½	1080	S. Francisco.	1897	1897	65,540	..	..	6 *4-in.*, 4 *6-pr.*, 2 *1-pr.*, 1 M.	..	12·9 *t*	120 / 226	140
,,	Wilmington	1392	250¾	40	10	1894	Newport News	1895	1897	57,536	1	2½	8 *4-in.*, 4 *6-pr.*, 4 *1-pr.*, 4 M.	..	15·0 *t*	100 / 300	175
,,	Yorktown	1710	230	36	16½	3392	Philadelphia	1888	1889	93,496	..	..	6 *6-in.*, 2 *6-pr.*, 2 *3-pr.*, 4 *1-pr.*, 2 M.	2	16·1 *t*	200 / 380	195

Also the sailing training ship Chesapeake (1175 tons), built at Bath, Me., and launched 1899. The steel sailing training ships Cumberland and Intrepid and the wooden brig Boxer have been launched, 1904.

Enrolled Auxiliary Cruisers of the United States Navy.

Class.	NAME.	Gross Tonnage.	Length.	Beam.	Depth.	Indicated Horse-Power.	Where Built.	When Built.	Owners.		Speed.
			ft.	ft.	ft.						
1st	St. Louis . . .	11,629	535½	63	26¾	18,000	Philadelphia .	1895	International Navigation Co.	. . . .	22·2
,,	St. Paul . . .	11,629	535½	63	26¾	18,000	,,	1895	,,	. . . .	22·5
,,	Paris. . . .	10,794	517	63¼	22	20,000	Clydebank, Scotland	1889	,,	. . . .	20·7
,,	New York . . .	10,802	517	63¼	22	20,000	,,	1888	,,	. . . .	20·6

Converted Merchant Vessels Retained.

Class.	NAME.	Displacement.	Length.	Beam.	Draught.	Indicated Horse-Power.	Where Built.	Date of Launch.	Cost.		Speed.	Coal.	Complement.
		tons.	ft.	ft.	ft.				£		knots.	tons.	
cr.	Buffalo . . .	6888	380½	48	22	3600	Newport News .	1893	117,949	. . . .	14·5	100	297
,,	Dixie . . .	6145	389¼	48	19¾	3800	Newport News .	1893	117,919	. . . .	16·0	1371	181
,,	Panther . . .	4260	310	40	18¼	..	Philadelphia .	1889	77,055	. . . .	13·0	475	198
,,	Prairie . . .	6872	390½	46¾	22	3800	Philadelphia .	1890	117,949	. . . .	14·5	1000	295
,,	Yankee . . .	6888	380½	48	22	3800	Newport News .	1892	117,949	. . . .	14·5	1000	282
,,	Mayflower (yacht) .	2690	275	36	17½	4600	Clydebank .	1896	38,359	. . . .	16.8	584	160

The armament of the above vessels includes 4-in., 5-in., and 6-in. guns.

SHIPS BELONGING TO POWERS WHOSE NAVIES ARE OF LESSER IMPORTANCE.

Belgium.—Several steam vessels, between 419 and 684 tons, principally employed as packets, under the orders of the Government. The Ville d'Anvers, 414 tons, for fishery protection.

Bulgaria.—Eleven steamers of small size, of which one is used as the Prince's yacht. Two armoured gunboats for the Danube completing at Leghorn. Other ships are to be laid down. The Nadiezda, a despatch vessel (715 tons) of the French Casabianca type, launched at Bordeaux in 1898; speed, 18·85 knots; 2600 I.H.P.; Lagrafel-d'Allest boilers; armament, 2 3·9-in., 3 1·8-in. Q.F., and 2 torpedo tubes.

Colombia.—The cruiser Almirante Lezo (*ex* El Baschir), of 1200 tons displacement; 2500 H.P.; speed, 18 knots; built in 1892, bought from Morocco, 1902. Two gunboats, Namuna and Atalanta, have also been bought. Two river gunboats, General Nerino and Esperanza, 400 tons.

Ecuador.—Two old (1886) French despatch vessels, Papin and Inconstant (891 tons), built of wood and iron, were bought. One torpedo boat and two steam transport vessels.

Egypt.—The Nile stern-wheel gunboats Sultan, Sheikh and Melik, 140 tons, Fateh and Naseh, 128 tons; also the Abu Klea, Hafir, Metemmeh, and Tamai. Some steam vessels on the coast.

Hayti.—Steel gunboat—Capois la Mort, 260 tons, 1 3·9-in., and 4 1-pr. Q.F. Iron corvette—Dessalines, 1200 tons, armed with 1 3·9-in. Q.F., 2 3·9-in. B.L., 2 L., 2 M. Two sloops—St. Michael and 1804. Gun vessel, 22nd of December.

Mexico.—The Zaragoza, built of steel, 1200 tons, 1300 H.P., 15 knots speed, and armed with 4 4·7-in. guns and 4 small quick-firing guns. Two gun vessels—Democrata and Mexico, of 450 tons and 11 knots speed, armed with 2 6½-in. muzzle-loaders and 2 small guns. Two small gunboats of 10 knots speed. Five torpedo boats. Two gun-vessels, Tampico and El Cruz, launched at Elizabethport, New Jersey, September, 1902, displacement, 980 tons; armament, 4 4-in. Q.F., 6 6-pr.; bow torpedo tube; 2400 I.H.P.; speed, 16 knots; fitted to serve as transport for 200 troops. Gun-vessels Bravo and Morero, 1200 tons; 2600 I.H.P.; 17 knots; launched at the Orlando Yard, Leghorn, 1904.

Persia.—Despatch vessel—the Persepolis—of 1200 tons and 10 knots speed. She is armed with 5 small breech-loading guns.

Peru.—Eclaireur, cruiser, 1769 tons, launched 1877, and partially reconstructed. Bought from France. Lima, built 1881, of 1700 tons displacement, 1800 I.H.P., 16 knots speed; armament, 2 6-in. B.L.R. guns. Screw steamer, Santa Rosa, of about 400 tons.

Roumania.—Elizabeta, protected cruiser (deck 3 in.), built in 1887 at Elswick; 230 ft. long, 32 ft. 10 in. beam; 1320 tons; 3000 I.H.P.; armament, 4 5·9-in. B.L.R., 4 Q.F., 2 M., 4 torpedo tubes. Composite gunboat Mircea, 360 tons; Grivitza, 110 tons. Two gunboats of 45 tons, and 3 first-class torpedo boats, these forming the sea division. For the Danube, the gunboats Fulgurul, Oltul, Siretul, Bistritza, 90 to 100 tons, the *torpilleur de barrage* Alexandru cel Bun (104 tons), 5 sloops, 2 small torpedo boats, and the paddle steamer Romania, 240 tons, repaired 1890. The shipbuilding programme contemplates the building of 8 monitors of 500 tons, 12 torpedo-boats and 8 vedettes for the Danube, and 6 coast-defence vessels of 3500 tons, 4 destroyers of 300 tons, and 12 torpedo-boats for the Black Sea.

Santo Domingo.—The Independencia, built in England 1894, 170 ft. long, 25 ft. broad, displacement 322 tons, and armed with seven Hotchkiss quick-firing guns. Restauracion, steel gun-vessel, 1000 tons, launched at Glasgow in 1896. The 14-knot cruiser Presidente has been reconstructed, and carries seven guns.

Sarawak.—Two gunboats, of 175 and 118 tons respectively, of low speed, each armed with two guns.

Siam.—Two corvettes (800 tons, 8 guns); six gunboats. One deck-protected cruiser, the Maha Chakrkri, 290 ft. long, 39 ft. 4 in. beam, of 2500 tons displacement and 17 to 18 knots speed; armament, four 4·7-in. quick-firing guns, and ten 6-pr. quick-firing guns. Makut-Rajakamar, 650 tons. The gunboats Bali, Muratha, and Sugrib, 600 tons, one 4·7-in. Q.F., five 2·2 in., four 1·4 in., 12 knots, launched 1898 and 1901. Three modern despatch vessels 100 to 250 tons.

Uruguay.—Gunboats: General Artigas, 274 tons, 12½ knots speed, 2 4·7-in. (Krupp), 2 M.; and General Saurez, 300 tons. A despatch vessel, a transport, and several steamers.

Venezuela.—The gunboats Bolivar (571 tons, 18·6 knots) and Miranda (200 tons, 12 knots); transports Restaurador (568 tons) and Zamora (350 tons).

BRITISH AND FOREIGN TORPEDO-BOAT FLOTILLAS.

Great Britain and Dependencies.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
Great Britain.			Feet	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO-BOAT DESTROYERS													
†Ardent	Chiswick	1894	201·6	19	7·3	2	247	4,500	27·97	1-12 pr. 5-6 prs.	2	45	60
Banshee	Birkenhead	1894	210	19·5	..	2	290	4,400	27·97	1-12 pr. 5-6 prs.	2	50	
†Boxer	Chiswick	1894	201·6	19	7·3	2	247	4,500	27·17	1-12 pr. 5-6 prs.	2	45	60
†Bruizer	Chiswick	1895	201·6	19	7·3	2	247	4,500	27·97	1-12 pr. 5-6 prs.	2	45	60
*Charger	Poplar	1894	190	18·5	5·25	2	250	3,100	27·98	1-12 pr. 5-6 prs.	2	45	60
Conflict	East Cowes	1894	205·6	20	..	2	270	4,370	27·21	1-12 pr. 5-6 prs.	2	50	60
Contest	Birkenhead	1894	210	19·5	..	2	290	4,400	27·4	1-12 pr. 5-6 prs.	2	50	60
†Daring	Chiswick	1893	185	19	7	2	237	4,300	27·70	1-12 pr. 3-6 prs.	3	45	50
*Dasher	Poplar	1895	190	18·5	5·25	2	250	3,182	26·21	1-12 pr. 5-6 prs.	2	45	60
Dragon	Birkenhead	1894	210	19·5	..	2	290	4,500	27·14	1-12 pr. 5-6 prs.	2	50	
Ferret	Birkenhead	1893	194	19·25	5	2	280	4,810	27·62	1-12 pr. 3-6 prs.	3	50	70
Fervent	Paisley	1895	200	19	7·8	2	270	3,800	[27]	1-12 pr. 5-6 prs.	2	50	70
†Handy	Fairfield	1895	200	19	7·8	2	260	3,800	27·04	1-12 pr. 5-6 prs.	2	50	70
Hardy	Sunderland	1895	196	19	5	2	245	4,200	26·8	1-12 pr. 5-6 prs.	2	50	70
†Hart	Fairfield	1895	185	19	7	2	260	4 010	27·07	1-12 pr. 5-6 prs.	2	50	70
*Hasty	Poplar	1894	190	18·5	5·25	2	250	3,250	26·08	1-12 pr. 5-6 prs.	2	45	60
Haughty	Sunderland	1895	196	19	5	2	265	4,000	27·1	1-12 pr. 5-6 prs.	2	50	60
Havock	Poplar	1893	180	18·5	5·25	2	240	3,500	26·77	1-12 pr. 3-6 prs.	3	43	57
Hornet	Poplar	1893	180	18·5	5·25	2	240	4,000	27·31	1-12 pr. 3-6 prs.	3	43	57
†Hunter	Fairfield	1895	200	19·7	6·5	2	260	4,000	27·2	1-12 pr. 5-6 prs.	2	45	60
Janus	Jarrow	1895	200	19·7	6·5	2	252	3,789	27·8	1-12 pr. 5-6 prs.	2	50	60
Lightning	Jarrow	1895	200	19·7	6·5	2	252	4,007	27·94	1-12 pr. 5-6 prs.	2	50	60
Lynx	Birkenhead	1894	194	19·25	5	2	280	4,000	27·00	1-12 pr. 3-6 prs.	3	50	70
Opossum	Hebburn	1895	200	19	5·2	2	290	4,052	28·24	1-12 pr. 5-6 prs.	2	50	60
Porcupine	Jarrow	1895	200	19·7	6·5	2	288	3,866	27·91	1-12 pr. 5-6 prs.	2	50	60
Ranger	Hebburn	1895	200	19	5·2	2	264	3,900	27·13	1-12 pr. 5-6 prs.	2	50	60
Rocket	Clydebank	1894	205·6	19·5	5·25	2	280	4,200	27·37	1-12 pr. 5-6 prs.	2	50	60
Salmon	Hull	1895	200	19·5	5·4	2	264	3,580	27·60	1-12 pr. 5-6 prs.	2	50	60
Shark	Clydebank	1894	205·6	19·5	5·25	2	280	4,250	27·59	1-12 pr. 5-6 prs.	2	50	60
Skate	Barrow	1895	195	20·5	..	2	265	4,100	27·10	1-12 pr. 5-6 prs.	2	50	60
Snapper	Hull	1895	200	19·5	5·5	2	270	4,500	27·9	1-12 pr. 5-6 prs.	2	50	60
Spitfire	Elswick	1895	200	19	5·3	2	300	3,780	27·5	1-12 pr. 5-6 prs.	2	45	60
Starfish	Barrow	1894	195	20·5	..	2	265	4,000	27·97	1-12 pr. 5-6 prs.	2	45	60
Sturgeon	Barrow	1894	195	20·5	..	2	265	4,010	27·16	1-12 pr. 5-6 prs.	2	45	60
Sunfish	Hebburn	1895	200	19	5·2	2	290	4,292	27·62	1-12 pr. 5-6 prs.	2	50	60
Surly	Clydebank	1894	205·6	19·5	5·25	2	280	4,400	28·05	1-12 pr. 5-6 prs.	2	50	50
Swordfish	Elswick	1895	200	19	5·3	2	300	4,100	[27]	1-12 pr. 5-6 prs.	2	45	60
Teazer	East Cowes	1895	200	19·5	5·6	2	270	4,500	[27]	1-12 pr. 5-6 prs.	2	50	60
Wizard	East Cowes	1895	200	19·5	5·2	2	270	4,400	[27]	1-12 pr. 5-6 prs.	2	45	60
Zebra	Blackwall	1895	200	20	6	2	300	3,850	27·00	1-12 pr. 5-6 prs.	2	50	60
Zephyr	Paisley	1895	200	19	5·3	2	270	3,850	[27]	1-12 pr. 5-6 prs.	2	50	60
†Albatross	Chiswick	1898	227·6	21·25	8·5	2	360	7,900	32	1-12 pr. 5-6 prs.	2	68	100
†Angler	Chiswick	1896	210	19·6	7·1	2	278	5,800	30·37	1-12 pr. 5-6 prs.	2	60	80
Arab	Clydebank	1901	218	20·0	5·6	2	360	6,000	31	1-12 pr. 5-6 prs.	2	60	80
†Ariel	Chiswick	1897	210	19·6	7·1	2	278	5,800	30·59	1-12 pr. 5-6 prs.	2	60	80
†Avon	Barrow	1896	210·6	21·6	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Bat	Jarrow	1896	215	20·75	6·8	2	326	6,185	30·1	1-12 pr. 5-6 prs.	2	60	91
†Bittern	Barrow	1897	210·6	21·6	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Brazen	Clydebank	1896	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Bullfinch	Hull	1901	210	20·6	5·8	2	300	5,800	30	1-12 pr. 5-6 prs.	2	60	80
†Cheerful	Hebburn	1897	210	21·0	8	2	308	6,000	30	1-12 pr. 5-6 prs.	2	62	82
†Coquette	Chiswick	1898	210	19·5	7·2	2	285	5,800	30·31	1-12 pr. 5-6 prs.	2	60	80
Crane	Jarrow	1896	215	20·7	6·8	2	324	6,336	30·3	1-12 pr. 5-6 prs.	2	60	80
†Cygnet	Chiswick	1898	210	19·5	7·2	2	285	5,800	30·35	1-12 pr. 5-6 prs.	2	60	80
†Cynthia	Chiswick	1898	210	19·5	7·2	2	285	5,800	30·2	1-12 pr. 5-6 prs.	2	60	80
†Desperate	Chiswick	1895	210	19·6	7·2	2	275	5,800	30	1-12 pr. 5-6 prs.	2	60	80
†Dove	Hull	1901	210·0	20·6	5·8	2	300	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Earnest	Birkenhead	1896	210·6	21·7	5·3	2	300	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
Electra	Clydebank	1901	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Express	Birkenhead	1897	227·6	22·0	9	2	300	9,000	31	1-12 pr. 5-6 prs.	2	60	80
Fairy	Fairfield	1897	227·6	22·0	9	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Falcon	Fairfield	1901	220	21·3	9	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Fame	Chiswick	1896	210·6	19·6	7·1	2	275	5,800	30·16	1-12 pr. 5-6 prs.	2	60	80
Fawn	Jarrow	1897	215	20·7	6·8	2	325	6,581	30·5	1-12 pr. 5-6 prs.	2	60	91
Flirt	Jarrow	1897	215	20·7	6·8	2	328	6,682	30	1-12 pr. 5-6 prs.	2	60	91
Flyingfish	Jarrow	1897	215	20·7	6·8	2	323	6,416	30·4	1-12 pr. 5-6 prs.	2	58	91

* Built by Yarrow, fitted with Thornycroft W.T. boilers at Earle's. All Jarrow-built destroyers have Reed's boilers. Vessels marked † have Thornycroft W.T. boilers.

The Decoy and Chamois have been lost.

Great Britain and Dependencies—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Mean Speed on Trial, or expected.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
TORPEDO BOAT DESTROYERS			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
†Foam	Chiswick	1896	210	19·6	7·1	2	275	5,800	30·18	1-12 pr. 5-6 prs.	2	58	80
Gipsy	Fairfield	1897	227·6	22·0	9	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Greyhound	Hawthorn's	1900	210	21	8·6	2	316	6,000	30	1-12 pr. 5-6 prs.	2	60	90
Griffon	Birkenhead	1896	210·0	20	5·3	2	300	6,000	30·11	1-12 pr. 5-6 prs.	2	58	80
Kestrel	Clydebank	1901	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Kangaroo	Jarrow	1901	215	20·75	6·8	2	335	6,500	30	1-12 pr. 5-6 prs.	2	..	91
†Lee	Sunderland	1899	210·0	19·9	7·6	2	283	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Leopard	Barrow	1897	210	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Leven	Fairfield	1901	218·0	20.0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Lively	Clydebank	1901	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Locust	Birkenhead	1896	210	21·7	5·3	2	300	6,000	30·16	1-12 pr. 5-6 prs.	2	58	80
†Mallard	Chiswick	1896	210·6	19·6	7·1	2	275	5,800	30·11	1-12 pr. 5-6 prs.	2	60	80
Mermaid	Hebburn	1898	210	21·0	8	2	308	6,000	30	1-12 pr. 5-6 prs.	2	62	82
Myrmidon	Jarrow	1901	215	20·75	6·8	2	335	6,500	30	1-12 pr. 5-6 prs.	2	..	91
Orwell	Birkenhead	1901	218·0	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Osprey	Fairfield	1901	227·6	22·0	9	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
†Ostrich	Fairfield	1901	210	21·0	9	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Otter	Barrow	1896	210	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	60	80
Panther	Birkenhead	1897	210·6	21·7	5·3	2	300	6,000	30·14	1-12 pr. 5-6 prs	2	58	80
Quail	Birkenhead	1895	213·6	21·6	5·3	2	300	6,000	30·38	1-12 pr. 5-6 prs.	2	58	90
Racehorse	Hawthorn's	1900	210	21	8·6	2	316	6,000	30	1-12 pr. 5-6 prs.	2	60	90
Recruit	Glasgow	1901	218·0	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Roebuck	Hawthorn's	1901	210	21	8·6	2	316	6,000	30	1-12 pr. 5-6 prs.	2	60	90
Seal	Birkenhead	1897	218·0	20·0	5·6	2	300	6,000	30·15	1-12 pr. 5-6 prs.	2	58	80
Spiteful	Jarrow	1898	215	20·75	6·8	2	334	6,500	30·1	1-12 pr. 5-6 prs.	2	..	91
Sprightly	Clydebank	1901	218	20·0	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
†Stag	Chiswick	1899	210	19·75	7·2	2	285	5,800	30	1-12 pr. 5-6 prs.	2	60	80
Star	Jarrow	1896	215	20·75	6·88	2	328	6,266	30·7	1-12 pr. 5-6 prs.	2	58	91
Success	Sunderland	1901	210·0	21·0	9·2¾	2	350	6,000	30	1-12 pr. 5-6 prs.	2	62	43
†Sylvia	Sunderland	1901	210	19·9	7·6	2	283	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Syren	Jarrow	1901	215	20·75	6·8	2	335	6,500	30	1-12 pr. 5-6 prs.	2	..	91
Thorn	Glasgow	1901	210	21	5·5	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Thrasher	Birkenhead	1896	210·6	21·7	5·3	2	300	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
Tiger	Glasgow	1901	210	21	5·5	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Vigilant	Glasgow	1901	210	21	5·5	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
†Violet	Sunderland	1901	210	20·75	6·88	2	283	5,400	30	1-12 pr. 5-6 prs.	2	58	80
Virago	Birkenhead	1896	210·6	21·7	5·3	2	300	6,000	30·13	1-12 pr. 5-6 prs.	2	58	80
*a*Vixen	Barrow	1901	210·0	20·0	5·8	2	327	6,000	30	1-12 pr. 5-6 prs.	2	62	88
Vulture	Clydebank	1901	218	20	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Whiting	Jarrow	1896	215	20·75	6·88	2	330	6,239	30·2	1-12 pr. 5-6 prs.	2	58	91
Wolf	Birkenhead	1897	218	20	5·6	2	300	6,000	30	1-12 pr. 5-6 prs.	2	58	80
Derwent	Hawthorn	1903	220	23	10	2	534	7,000	25	1-12 pr. 5-6 prs.	2	70	130
‡Eden	Parsons	,,	220	23	8¾	6	527	7,000	25	1-12 pr. 5-6 prs.	2	70	130
Exe	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5-6 prs.	2	70	95/127
Ribble	Yarrow	,,	225	23½	10	2	550	7,500	26	1-12 pr. 5-6 prs.	2	70	120
Itchen	Laird	,,	225	23½	10	2	550	7,000	25½	1-12 pr. 5-6 prs.	2	70	130
Usk	Yarrow	,,	225	23½	10	2	550	7,500	26	1-12 pr. 5-6 prs.	2	70	120
Teviot	Yarrow	,,	225	23½	10	2	550	7,500	26	1-12 pr. 5-6 prs.	2	70	120
Ettrick	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5-6 prs.	2	70	95/127
Foyle	Laird	,,	225	23½	10	2	550	7,000	25½	1-12 pr. 5-6 prs.	2	70	120
Erne	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5-6 prs.	2	70	95/127
Arun	Laird	,,	225	23½	10	2	550	7,000	25½	1-12 pr. 5-6 prs.	2	70	130
Blackwater	Laird	,,	225	23½	10	2	550	7,000	25½	1-12 pr. 5-6 prs.	2	70	130
Cherwell	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5-6 prs.	2	70	95/127
Dee	Palmer	,,	225	23½	10	2	540	7,000	25½	1-12 pr. 5-6 prs.	2	70	95/127
Jed	Chiswick	1904	222	23½	9·6	2	640	7,500	25½	1-12 pr. 5-6 prs.	2	70	{ 95/126
Kennet	Chiswick	1903	222	23½	9·6	2	640	7,500	25½	1-12 pr. 5-6 prs.	2	70	
‡Velox	Parsons	,,	210	23	8½	8	440	8,000	27	1-12 pr. 5-6 prs.	2	63	90
Waverney	Hawthorn	,,	220	23½	10	2	534	7,000	25	1-12 pr. 5-6 prs.	2	70	130
Welland	Yarrow	,,	225	23½	10	2	550	7,500	26	1-12 pr. 5-6 prs.	2	70	120
Chelmer	Chiswick	1904											
Boyne	Hebburn	1904											
Colne	Chiswick	1905											
Doon	Yarrow	1904											
Gala	Yarrow	1905											
Garry	Yarrow	Bldg.											
Kale	Yarrow	1904											
Rother	Jarrow	1904	} 222	23½	9·6	2	600	7,500	25·5	1-12 pr. 5-6 prs.	2	72	{ 95/126
Liffey	Birkenhead	1904											
Moy	Birkenhead	1904											
Ness	Cowes	1905											
Nith	Cowes	Bldg.											
Ouse	Birkenhead	1905											
Swale	Palmer	Bldg.											
Ure	Palmer	1904											
Wear	Palmer	1905											

‡ Hulls and Yarrow boilers of these vessels by Hawthorn Leslie & Co. *a* Has four Express W.T. boilers.

The fourteen vessels of the programme 1904-05 will not be put in hand.
Programme 1905-6—5 ocean-going, 1 special type, 12 coastal torpedo-boat destroyers.

Great Britain and Dependencies—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
TORPEDO BOATS.													
FIRST CLASS—													
1 (*ex* Lightning)	Chiswick ..	1877	84·6	10·9	5	1	27	460	19	..	1	..	
2–9 (8 boats)	Chiswick ..	1878–9	87	10·9	4	1	28	450	20	..	1	15	
10	Chiswick ..	1880	90·5	10·9	4	1	28	450	21·7	..	1	15	
11, 12 (2 boats)	Chiswick ..	1880	87	10·9	4	1	28	450	20	..	1	15	7
13	Lambeth ..	1878	87	10·9	4	1	28	460	21	..	2	15	7
14	Poplar	1878	87	11	4·5	1	33	550	22	..	2	15	7
15	..	..	87	10·9	4	1	28	450	21	..	2	15	7
17, 18 (2 boats)	Poplar	1877	86	11	4·5	1	33	450	21	..	2	15	7
19	East Cowes ..	1878	87	10·9	4	1	28	460	21	..	2	15	7
20	..	1880	87	10	4	..	28	360	16·9	..	2	15	
21, 22 (2 boats)	Chiswick ..	1885	113	12·5	5·7	1	63	730	20	..	3	..	16
23, 24 (2 boats)	Poplar	1885–6	113	12·5	5·5	1	67	600	19·5	2–3 prs.	3	..	
25–29 (5 boats)	Chiswick ..	1886	127·5	12·5	6·2	1	60	600	21	..	4	15	
30–33 (4 boats)	Poplar	1886	125	13	5·5	1	60–66	670	19·5	2–3 prs.	5	15	20
*a*34–38 (5 boats)	East Cowes ..	1886	125	14·6	4	1	60–66	950	18–19	..	5	15	
39, 40 (2 boats)	Poplar	1885	100	12·5	..	..	40	500	..	..	1	15	
41–60 (20 boats)	Chiswick ..	1886	127·5	12·5	6·2	1	60	700	21	2–3 prs.	4	15	
61, 63–74, 76–78 (16 boats)	Poplar .. .	1886	125	13	5·5	1	75	700	19–20	2–3 prs.	5	15	20
79	Poplar	1886	125	13	5·5	..	75	1,000	22·4	2–3 prs.	..	15	20
80	Poplar	1887	135	14	6	1	105	1,540	23	4–3 prs.	5	21	30
81 (*ex* Swift)	East Cowes ..	1885	150	17·5	..	1	125	..	..	6–3 prs.	3	25	35
82–87 (6 boats)	Poplar	1889	130	13·5	5·5	1	85	1,100	23	3–3 prs.	3	19	20
88, 89 (2 boats)	Poplar	1891	142	14·75	4·5	1	112	1,600	..	3–3 prs.	3	18	20
90	Poplar	1895	140	14·25	3·7	1	100	1,430	..	3–3 prs.	3	18	18
91, 92 (2 boats)	Chiswick ..	1894	140	15·5	7·5	1	130	2,400	23–24	3–3 prs.	3	18	25
93	Chiswick ..	1893	140	15·5	5·4	2	130	2,200	23·5	3–3 prs.	3	18	25
94–96 (3 boats)	East Cowes ..	1894	140	15·5	..	1	130	2,000	23·2	3–3 prs.	3	18	25
97	Birkenhead ..	1893	140	15·5	..	1	130	2,690	23·35	3–3 prs.	3	18	25
b {98 and 99 .. .. .. / 107 and 108 .. .. ..}	Chiswick ..	1901	160	17	8·4	1	178	2,850	25	3–3 prs.	3	32	20
109–113	Chiswick ..	1902	166	17·25	8·4	1	200	2,900	25	3–3 prs.	3	32	42
114–117	Cowes	1903	165	17·6	8·8	1	205	2,900	25	3–3 prs.	3	32	23
SECOND CLASS—													
38–48 (10 boats)	Poplar	1889	60	9·2	3·7	1	16·5	230	16·5	1 mach.	1	9	13
49, 50 (2 boats)	Poplar	1887	60	8·5	3	1	15	200	17	1 mach.	1	9	
51–62 (12 boats)	Chiswick ..	1878–9	60·5	7·5	3·5	1	..	..	16·5	..	2	7	
63	..	1879	60	..	..	1	..	..	15	..	2		
64–73 (10 boats)	Chiswick ..	1880–1	60·5	7·5	3·5	1	..	..	16–17	..	2	7	
74, 75, 96, 97 (4 boats) ..	Poplar	1883	62	7·6	3·6	1	12	..	16	1 mach.	2	7	
76–95 (20 boats)	Chiswick .	1882–3	63	7·5	3·5	1	..	..	16·5–17	..	2	7	
98	Chiswick .	1883	66·3	7·5	2·5	hyd.	..	120	12·6	..	2	7	
99, 100 (2 boats)	Chiswick ..	1886	64	8	3·6	1	..	..	16–16·8	..	2	7	
101	..	..	64	..	..	..	..	..	..	..	2	7	
1–9 (9 boats)	East Cowes ..	..	56	..	..	1	12	..	14·5	2 mach.	sp	..	·5
COLONIAL, ETC.—													
Victoria.													
Childers	Chiswick ..	1883	113	12·5	5·9	1	65	730	20	2–1 prs.	..	12	10
One boat	Poplar	1891	130	13·5	5·7	1	82	1,150	23	3–3 prs.	3	19	20
Nepean, Lonsdale (2 boats)	Chiswick ..	1884	63	7·5	3·2	1	12	150	17·5	..	1	7	
New South Wales.													
Acheron, Avernus (2 boats)	..	1879	..	..	..	1	16	300	16				
Queensland.													
Mosquito	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
Wasp	..	..	..	..	..	..	12	..	..	..	..	7	
Tasmania.													
One boat	Chiswick ..	1884	63	7·5	3·2	1	12	..	17	..	1	7	
New Zealand.													
Nos. 1–4 (4 boats)	Chiswick ..	1884	63	7·5	3	1	12	170	17	1 mach.	Sp.		
India.													
Nos. 1–3 (3 boats)	Chiswick ..	1888	134·5	14·8	7·1	1	96	1,270	23·2	2 Q.F.	5		
Nos. 4–6 (3 boats)	East Cowes ..	1889	130	14·6	..	..	95	1,030	20				
No. 7	Paisley	1888	130·4	14	..	..	92	1,060	21				
SUBMARINES—													
5 boats (Nos. 1–5) ..	Barrow	1901–2	63·4	11·9	..	1	120	150	7½	..	1	7	..
3 boats (Nos. A 2–A 4, programme 1902–03).	Barrow	1903	100	10	..	1	180	150	{15 / 10}	..	2	..	11
10 new boats (Nos. A5–A14, programme 1903–4).	Barrow	1904	150	..	..	..	..	..	16	..	..	..	..
10 new boats (B Class) .	Barrow	1905	..	..	..	..	300	850	13·9	..	..	..	..
11 new boats (programme 1905–06)	Barrow	..	..	..	..	..	..	..	..	..	..	..	..

a No. 34 is fitted with Laird W.T. boilers. *b* Water-tube boilers of Thornycroft type.

Argentine Republic.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Corrientes	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	27·4 *t.*	*1 14-pr.	3	54	80
Missiones..	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·0 *t.*	3 6-pr,	3	54	80
Entre Rios	Poplar.. ..	1896	190	19·6	7·4	2	280	4,000	26·7 *t.*	Q.F., 2 M.	3	54	80
FIRST CLASS—													
2 boats	Chiswick ..	1890–1	150	14·5	5·2	2	110	1,500	24·52	3 3-prs.	3	27	22
6 boats	Poplar.. ..	1890	130	13·5	6	1	85	1,200	23–24	2 3-pr. Q.F.	2	15	15
4 boats	Poplar.. ..	1880–2	100	12·5	6	1	52	600	20	2 mach.	3	14	10
SECOND CLASS—													
Nos. 1–8 (8 boats)..	Poplar.. ..	1890	60	9.2	3	1	16	230	17	1 Q.F.	1	10	1·25
Nos. 9–10 (2 boats)	Chiswick ..	1881	60	7·5	3·5	1	16	230	17	..	1		

The two 150-ft. boats are named Comodoro Py and Murature.

The six 130-ft. boats are named Bathurst, Buchardo, Jorge, King, Pinedo, and Thorne. They have locomotive boilers.

The four 100-ft. boats are named Alerta, Centella, Ferre, and Py.

* ½-in. plating over entire engine and boiler space (Yarrow W.T. boilers).

Austria-Hungary.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYER—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
X	Poplar.. ..	Bldg.	219·8	20·3	..	2	384	6,000	28	1 12-pr. 7 3-pr.		64	
FIRST CLASS—													
Adler, Falke	Poplar.. ..	1886	135	13·7	5·6	1	95	900	22·4	2 Nord.	2	16	28
22 boats	Elbing, Trieste, &c.	1886-9	128	15·9	6·9	1	83	900 / 1,000	17·5 to 21·5	2 mach.	2	15	28
X	Poplar.. ..	Bldg.	179·9	18·0	..	1	197	3,000	25	4 3-pr.		25	
Boa .. .. Cobra .. .. .. Kigyo .. .. .. Python	Poplar.. ..	1898–9	152·6	15·3	7·6	1	133	2,000	24·3	2 3-pr. Q.F.	3	24	30
Viper	Poplar.. ..	1896	147·6	14·9	7·6	1	130	2,000	26·5	2 3-pr. Q.F.	2	26	30
Natter	Elbing ..	1896	150	17·5	8·8	2	152	2,300	26·5	2 3-pr. Q.F.	3	..	30
SECOND CLASS—													
Nos. 9, 10 (2 boats)	Chiswick, Poplar, Pola and Elbing	1881	98·5	10·8	2·9	1	37	450	17	1 Q.F.	1		
Nos. 11–32 (22 boats)		1883–7	107	11·6	3·1	1	47	600	17				
Nos. 33–39 (7 boats)		1887–9	118·1	14·4	3·3	1	64	700	18	2 Q.F.	1		
Nos. 2–8 (7 boats) ..	Pola and Poplar ..	1878-81	87·4	9·6	2·8	1	27	300	15	..	1		

Brazil.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Nos. 1-5 (5 boats)	Poplar.. ..	1882	100	12·5	5·5	1	52	600	20	2 mach.	2	16	20
Araguary	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·1	2 Q.F.	4	27	22
Iguatemi	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·4	2 Q.F.	4	27	22
Marcilio Diaz	Chiswick ..	1891	150	14·5	5·2	2	150	1,550	25·8	2 Q.F.	4	27	22
5 boats	Elbing ..	1892-3	152	17·2	7·9	2	130	2,200	28	2-1 prs.	3	24	30
SECOND CLASS—													
Inhanhuay (wood)..	New York..	1893	90	10	3	..	17	..	25	1-1 pr.	1	10	
4 boats	..	1883-4	..	..	..	1	17	..	17				
1 boat	Chiswick ..	1885	63	75	3·2	1	..	..	17	..	..	..	2
1 boat	Poplar.. ..	1886	60	8	3	1	14	200	17	..	1		

Two submarine boats, Jacinto Gomez and Mello Marques, in hand.

Chili.

Name or Number.	Where Built.	Launched.	Dimensions.			Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Length.	Beam.	Draught.								
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Capitan Orella ..	Birkenhead.	1896	210	21·6	5·4	2	300	6000	30·17	1-12 pr. Q F. 5-6 pr.	2	65	90
Capitan Munoz Gamero.. ..	Birkenhead.	1896	210	21·6	5·4	2	300	6000	30·42	1-12 pr Q.F. 5-6 pr.	2	65	90
Teniente Serrano ..	Birkenhead.	1896	210	21·6	5.4	2	300	6000	30 35	1-12 pr. Q.F. 5 6 pr.	2	65	90
Guardia-Marina Riquelme ..	Birkenhead.	1896	210	21·6	5·4	2	300	6000	30·09	1-12 pr. Q.F. 5-6 pr.	2	65	90
Capitan Merino Tarpa .. .. .. Capitan O'Brien ..	Birkenhead.	1901	210	21 6	5·4	2	350	6000	30	Do.	2	65	90
FIRST CLASS—													
3 boats	Poplar.. ..	1881	86	12·5	..	1	25	400	19-20	..	4	15	
5 boats	Poplar.. ..	1881	100	12·5	..	1	35	400	18-19	4 mach.	4	15	9
Sarjento Aldea ..	Poplar.. ..	1886	125	13·5	5·5	1	70	800	20	2 Q.F.	4	18	15
Injeniero Hyatt, Cirujano Videla, Injeniero Mutilla, Guardia-Marina Contreras, Capitan Thompson, and Teniente Rodriguez (Viper type) ..	Poplar.. ..	1896 1898	152·6	15·3	7·9	1	140	2200	27·5 27·2	3-3 pr. Q.F.	3	28	40
Janequeo, Guale, Rucumilla, and Guacolda	Poplar.. ..	1881	100	12·5	..	1	..	450	..	..	..	..	
Tegualda, Quidora, and Fresia	Poplar.. ..	..	87	10·9	..	1	..	400	..	..	..	..	
SECOND CLASS—													
1 boat	East Cowes	1887	50	..	..	..	..	..	16	..	..	..	
1 boat	East Cowes	1892	60	9·6	5	1	15	270	19	..	1	..	
1 boat	La Seyne ..	1895	42	8·6	..	1	..	..	..	..	1	..	

The Thompson and Rodriguez were sent out in sections, and put together at Talcahuano and Valparaiso.

China.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
FIRST CLASS—													
3 boats	Elbing ..	1886–97	144·3	16·4	7·5	1	128	1,400	24·2	4 1-pr. revs.	2	20	15
1 boat	Poplar.. ..	1887	128	13	5	1	69	1,000	23·9	3 Q.F., 4 Gatlings	3	28	15
25 boats	Stettin, &c..	1886–87	110	13	4·9	1	65	1,000	19·5	1-pr. revs.	3	16	10
2 boats	Stettin ..	1883	86	10·4	3·4	1	28	650	18·2	1-pr. revs.	2	16	12
2 boats	Stettin ..	1897	123·5	21·7	..	..	120	..	20	2 1-pr.	3	20	
SECOND CLASS—													
11 boats	Elbing ..	1885–86	85	11·9	4·8	1	27	400	19	..	1	..	5
1 boat	Foochow ..	1903	88·6	6·7	3·3	1	30	550	20·5				

About twenty boats only are said to be serviceable.

Costa Rica.

Costa Rica has one 62-ft., 15-knot boat.

Denmark.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Dimensions. Beam.	Dimensions. Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
Hajen	Copenhagen	1896											
Havörnen	Copenhagen	1897	154·3	15·4	7·9	2	142	2,317	22·9	1 4·7-in. 1 1-pr.	3	..	..
Söbjörnen	Copenhagen	1898											
Delfinen	Chiswick ..	1883	111·5	12·6	6	1	59	620	20	1 mach.	2	14	9
Havhesten	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·8	2 1-pr. revs.	4	20	15
Hvalrossen	Chiswick ..	1884	114	12·6	6·5	1	64	660	18·7	1 mach.	2	14	10
Makrelen	Copenhagen	1893	140	14·2	7	2	112	1,200	..	..	..	..	16
Narhvalen	Chiswick ..	1888	137·9	14	7	1	94	1,200	22·3	2 1-pr. revs.	4	20	15
Nord Kaperen.. ..	Copenhagen	1893	140	14·2	7	2	112	1,200	..	2 1-pr. revs.	4	..	16
Sölöven	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23·3	2 mach.	4	20	14
Sóulven	Havre.. ..	1880	94·8	10·9	3·9	1	37	450	18·1	..	2	12	5
Springeren	Copenhagen	1891	119	13	4·9	1	81	800	18·3	2 1-pr. revs.	2	20	14
Stören	Chiswick ..	1887	131	14·8	6·8	1	89	1,200	23	2 mach.	4	20	14
Sværdfisken	Chiswick ..	1881	110	12	6	1	49	600	20·7	1 mach.	2	14	9
SECOND CLASS—													
Nos. 4, 5 (2 boats) ..	Chiswick ..	1882	63	7·5	2·5	1	15	150	16·9	1 mach.	2	6	1
Nos. 6, 7 (2 boats) ..	Chiswick ..	1884	66·8	8	4·2	1	16	170	15·4	1 mach.	2	6	1·5
Nos. 8, 9 (2 boats) ..	Chiswick ..	1886	69·5	8·1	3·8	1	17	170	15·7	1 mach.	2	6	1
Nos. 10, 11 (2 boats).	Chiswick ..	1888	70·2	8	4	1	18	180	15·8	1 mach.	2	6	1
Nos. 12, 13 (2 boats).	Chiswick ..	1889	78·3	9	4·9	1	24	350	18	1 mach.	2	8	3
1 boat	Chiswick ..	1875	58	7·5	3	1	..	..	16	..	sp.		

Four destroyers and two boats are provided for.

France.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Arbalète	Normand	1903	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	75
Arc	Châlon	1903	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	75
Arquebuse	Normand	1902	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	75
Baliste	Rouen	1903	183·9	20·11	10·3	2	300	6000	29·4	1-9pr. 6-3prs.	2	62	75
Bélier	Nantes	1903	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	75
Bombarde	Havre (F.&C.)	1903	183·9	20·11	10·3	2	300	6000	30·5	1-9pr. 6-3prs.	2	62	75
Carabine	Rochefort	1902	183·9	20·11	10·3	2	305	6300	28	1-9pr 6-3 prs.	2	62	75
Catapulte	Havre (F.&C.)	1903	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	75
Claymore	Normand	Bldg.	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	75
Dard	Rouen	1903	183·9	20·11	10·3	2	310	6500	29·4	1-9pr. 6 3prs.	2	62	75
Durandal	Normand	1899	180·5	20·8	10·3	2	300	5000	28	1-9pr. 6-3prs.	2	62	84
Epée	Havre (F.&C.)	1900	183·9	20·8	10·3	2	319	5700	26	1-9pr. 6-3prs.	2	62	75
Epieu	Normand	1903	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	75
Escopette	Rochefort	1900	183·9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	62	75
Fauconneau	Normand	1900	183·9	20·8	10·3	2	300	5000	27·1	1-9pr. 6-3prs.	2	62	84
Flamberge	Rochefort	1901	183·9	20 8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	62	75
Francisque	Rochefort	1904	183·9	20·11	10·3	2	305	6300	28	1-9pr. 6-3prs.	2	62	75
Fronde	Bordeaux	19 3	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	65
Hallebarde	Normand	1899	180·5	20·8	10·3	2	305	5300	27·2	1-9pr. 6-3prs	2	62	84
Harpon	Bordeaux	1903	183·9	20·11	10·3	2	300	6000	28	1 9pr. 6-3prs.	2	62	75
Javeline	Nantes	1903	183·9	20·11	10 3	2	300	7000	29·3	1-9pr. 6 3prs.	2	62	75
Mortier	Rochefort	Bldg.	183·9	20·11	10·3	2	305	6300	28	1-9pr. 6-3prs.	2	62	75
Mousquet	Nantes	1902	183·9	20·11	10·3	2	300	6300	30 2	1-9pr. 6-3prs.	2	62	75
Mousqueton	Châlon	1903	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	75
Obusier	Rochefort	Bldg.	183·9	20·11	10·3	2	305	6300	28	1-9pr. 6-3prs.	2	62	75
Pertuisane	Rochefort	1900	183·9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	62	75
Pierrier	..	Bldg.	183·9	20·11	10·3	2	305	6300	28	1-9pr. 63-prs.	2	62	75
Pique	Havre (F.&C.)	1900	183·9	20·8	10·3	2	319	5700	26	1-9pr. 6-3prs	2	62	75
Pistolet	Nantes	1903	183·9	20·11	10·3	2	300	6000	28	1-9pr. 6-3prs.	2	62	75
Rapière	Rochefort	1901	183·9	20·8	10·3	2	300	5700	26	1-9pr. 6-3prs.	2	62	75
Sabre	Rochefort	1904	183·9	20·11	10·3	2	305	6300	28	1-9pr. 6-3prs.	2	62	75
Sagaïe	Havre (F.&C.)	1902	183·9	20·11	10·3	2	300	6000	30·1	1-9pr. 6-3prs.	2	62	75
Sarbacane	Rochefort	1903	183·9	20·11	10·3	2	305	6300	28	1-9pr 6-3prs.	2	62	75
Stylet	Rochefort	Bldg.	183·9	20·11	10·3	2	305	6300	..	1-9pr. 6-3prs.	2	62	75
Takou *	Elbing	1898	193·7	21·0	..	2	280	6000	35	6-3 pr. Q.F.	2	62	67
Tromblon	Rochefort	Bldg.	193·7	21 0	..	2	305	6300	35	6-3 pr. Q.F.	2	62	67
Yatagan	Nantes	1900	183 9	20·8	10·3	2	319	5700	26	1-9pr. 6-3prs.	2	62	33
Carquois	Rochefort	Bldg.	183 9	19·6	10·3	2	335	7200	30	1-9 pr.	2	62	37
Trident	Rochefort	Bldg.	183·9	19·6	10·3	2	335	7200	30	1-9 pr.	2	62	37
M 40, 43 (4)	..	Bldg.	190·4	20·4	9 8	2	336	6800	28	{ 1 2·56-in. / 6 1·85-in. }	2		
16 Boats	Private yards												
SEA-GOING—													
Agile	La Seyne	1889	139	14·7	7·7	2	121	1,100	20·4	3-3 prs.	2	26	14
Alarme	St. Nazaire	1889	151	15·7	8·3	2	169	1,400	20·5	2-3 prs.	4	30	40
Aquilon	Normand	1895	137·8	14·6	7·9	2	127	2,000	26·17	2-3 prs.	2	34	17
Archer	Normand	1893	138	14·7	6·5	2	131	1,250	21	2-3 prs.	2	26	17
Argonaute	St. Denis	1893	141	16·4	9·3	2	132	1,500	25·1	2-3 prs.	2	34	16
Audacieux	Nantes	1900	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	3	..	18
Aventurier	St. Nazaire	1889	151	15·7	8·3	2	174	1,400	20·5	2-3 prs.	4	34	40
Averne	Havre (F.&C.)	1894	141	16·4	9·3	2	133	1,500	24·4	2-3 prs.	2	27	16
Borée	Bordeaux	1900	147·7	16·7	8·0	2	160	4,400	30	2-3 prs.	2	..	18
Bourrasque	Normand	1901	147·7	16·7	8·0	2	160	4,400	31·41	2-3 prs.	2	..	18
Cerbère	..	1899	137 8	14·6	7·9	2	127	2,000	25	2-3 prs.	2	34	17
Chevalier	Normand	1893	144·3	15·7	6·8	2	131	2,700	27·2	2-1 prs.	2	32	17
Corsaire	St. Denis	1893	160·5	15	5·4	2	171	2,500	25·5	4-1 prs.	2	32	15
Coureur	Chiswick	1888	147·5	14·5	4·6	2	129	1,550	23·28	4 Nords.	2	27	22
Cyclone (ex-Tenare)	Normand	1898	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	2	..	18
Dauphin	Havre (F.&C.)	1894	141	16·4	9·3	2	137	1,500	25·22	2-3 prs.	2	34	16
Défi	St. Nazaire	1889	151	15·7	8·3	2	173	1,400	21	2-3 prs.	4	30	40
Dragon	Normand	1892	138	14·7	8·2	2	129	1,400	25	2-3 prs.	2	26	15·5
Eclair	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·5	3-3 prs.	2	26	17
Flibustier	Normand	1894	143	16·4	9·3	2	132	1,500	23·5	2-3 prs.	2	34	16
Forban	Normand	1895	144·2	15·2	10	2	135	3,200	31·2	2-1 prs.	2	..	..
Grenadier	Normand	1892	138	14·7	8·2	2	129	1,400	25·25	2-3 prs.	2	26	15·5
Grondeur	Havre (F.&C.)	1892	147·5	14·5	5	2	130	1,550	24	2-3 prs.	2	27	20
Kabyle	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·6	3-3 prs.	2	27	17
Lancier	Normand	1893	138	14·7	8·2	2	128	1,400	25·79	2-3 prs.	2	26	15·5
Mangini	Nantes	1896	147·6	14·8	7·9	2	129	2,100	27·5	2-3 prs.	2	34	17
Mistral	Normand	1901	147·7	16·8	8·8	2	182	4,200	30	2-3 prs.	3	..	23
Mousquetaire	Havre (F.&C.)	1892	154	15·7	7	2	150	2,100	24·77	2-1 prs.	2	32	18
Orage	La Seyne	1891	144·3	14·7	7·7	2	128	1,100	21·7	3-3 prs.	2	26	17
Ouragan	Nantes	1887	151	15·7	8·3	2	174	1,400	20	2-3 prs.	4	30	40
Rafale	Normand	1901	147·7	16·7	8·0	2	160	4,400	31·47	2-3 prs.	2	..	18
Sarrasin	Bourdeaux	1893	139	14·7	7·7	2	131	1,100	20·5	3-3 prs.	2	26	14
Simoun	Havre (F.&C.)	1901	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	3	..	18
Siroco	Normand	1901	147·7	16·8	8·8	2	182	4,200	30	2-3 prs.	3	..	23
Teméraire	St. Nazaire	1889	151	15·7	8·3	2	174	1,400	21	2-3 prs.	4	30	40
Tourbillon	Bourdeaux	1892	139	14·7	7·7	2	131	1,100	20·5	3-3 prs.	2	26	14
Tourmente	St. Denis	1893	141	16·4	9·3	..	132	1,500	24·6	2-3 prs.	2	25	15
Tramontane	Bordeaux	1900	147 7	16·7	8·0	2	160	4,400	30	2-3 prs.	2	..	18
Trombe	Nantes	1900	144·2	15·2	10·0	2	152	4,200	30	2-3 prs.	3	..	18
Turco	St. Denis	1892	138	14·7	8·2	2	124	1,400	21·3	2-3 prs.	2	26	15·5
Typhon	Havre (F.&C.)	1901	144·2	15·2	10 0	2	152	4,200	30	2-3 prs.	3	..	18
Véloce	Havre (F.&C.)	1892	147·5	14·5	5	2	130	1,550	23·6	2-3 prs.	2	27	20
Zouave	St. Denis	1892	138	14·7	8·2	2	124	1,400	21·3	2-3 prs.	2	26	15·5

* Captured from the Chinese at Taku, 1900. N.B.—"F. & C." "Forges et Chantiers."
"Normand" means that the boat has been built at that firm's yard at Havre.

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
Balny	Normand ..	1886	131·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Bouët-Willaumez .. .	St. Denis ..	1888	131·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Capt. Cuny	..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Capt. Mehl	..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Challier	..	1886	131·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Dehorter	St. Denis ..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Deroulède	Normand .	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Doudart de Lagrée	Normand ..	1886	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
Edmond Fontaine	St. Denis ..	1888	134·5	11	7·2	1	66	700	20	2–1 pr. rev.	2	21	12
126–129 (4 boats)	Normand ..	1889-90	118	13·2	8·6	1	80	1,250	21	2–1 prs.	2	21	10
145–149 (5 boats)	Normand ..	1891–3	118	13·2	8·7	1	79	1,300	23·9	2–1 prs.	2	21	10
152–154 (3 boats)	Normand ..	1892–3	118	13·2	8·7	1	80	1,300	24·6	2–1 prs.	2	21	10
155–157 (3 boats)	Bordeaux ..	1893	118	13·2	8·7	1	80	1,300	23	2–1 prs.	2	21	10
158–160 (3 boats)	Cail	1893	118	13·2	8·7	1	80	1,300	23	2–1 prs.	2	21	10
161–163 (3 boats)	St. Nazaire ..	1892	118	13·2	8·7	1	80	1,300	23	2–1 prs.	2	21	10
164–166 (3 boats)	La Seyne ..	1892	118	13·2	8·7	1	79	1,300	23	2–1 prs.	2	21	10
167–169 (3 boats)	Creusot ..	1892	118	13·2	8·7	1	81	1,300	23	2–1 prs.	2	21	10
170, 171 (2 boats)	Normand ..	1893	118	13·2	8·7	1	80	1,300	23–24	2–1 prs.	2	21	10
172, 173 (2 boats)	Havre	1893–4	118	13·2	8·7	1	89	1,390	23–24	2–1 prs.	2	21	10
174–176 (3 boats)	Havre	1893–5	118	13·2	8·7	1	94	1,330	23–24	2–1 prs.	2	21	10
177–179 (3 boats)	Havre	1893	118	13·2	8·7	1	79	1,300	23–24	2–1 prs.	2	21	10
180–187 (8 boats)	Normand, etc.	1894–5	118	13·2	8·6	1	80	1,500	25·7	2–1 prs.	2	21	10
188–191 (4 boats)	Havre, etc.	1893–4	118	13·2	8 6	1	80	1,500	24–2	2–1 prs.	2	21	10
192–194 (3 boats)	Havre, etc.	1894–5	118	13·2	8·	1	82	1,300	23·55	2–1 prs.	2	21	10
195–200 (6 boats)	Havre, etc.	1894–5	319	13·2	8·7	1	80	1,300	23·5	2–1 prs.	2	21	10
201–205 (5 boats)	Normand ..	1897–8	121·4	13·4	8·6	1	84	1,700	25·9	2–1 prs.	2	23	10
206–211 (6 boats)	Bordeaux ..	1897–8	121·4	13·6	8·6	1	86	1,500	23·5	2–1 prs.	2	23	10
212–215 (4 boats)	Normand ..	1899	121·4	13·6	8·6	1	86	1,800	27	2–1 prs.	2	23	10
216–226 (11 boats) ..	Cherbourg, Toulon, etc.	1899–1902	121·6	13·6	8·6	1	86	1,500	23·5	2–1 prs.	2	23	10
227–235 (9 boats)	Bordeaux, etc.	Bldg	121·4	13·2	8·7	1	86	1,500	23·5	2–1 prs.	2	23	10
236–255 (20 boats) ..	Bordeaux, etc.	Bldg	121·4	13·2	8·7	1	90	1,500	23·5	2–1 prs.	2	23	10
256–257 (2 boats)	..	1900	124·8	13·2	8·7	1	97	2,000	26·0	2–1 prs.	3	24	10
258–261 (4 boats)	Bordeaux ..	Bldg.	124·8	13·2	8·7	1	97	2,000	26·0	2–1 prs.	3	24	10
262–263 (2 boats)	Creusot ..	Bldg.	124·8	13·2	8·7	1	97	2,000	26·0	2–1 prs.	3	24	10
264–265 (2 boats)	Bordeaux ..	1902	124·8	13·2	8·7	1	97	2,000	26·0	2–1 prs.	3	24	10
266–276 (11 boats) ..	Bordeaux etc.	1902	124·8	13·2	9·6	1	97	2,000	26·0	2–1 prs.	3	24	10
*277–294 (18 boats) ..	Bordeaux, etc.	1904	124·8	14·0	9·6	1	97	2,000	26·0	2–1 prs.	3	26	10
295–317 (23 boats) pro.'93	Normand, etc.	1904											
318–367 (50 boats) pro.'94	..	Bldg.											
2 boats	Toulon ..	..											
20 boats, programme '95	..	..											
4 boats	Saigon ..	Bldg.											
SECOND CLASS—													
60–64 (5 boats)	Normand ..	1883	108·2	10·3	6·1	1	45	400	19	2–1 prs.	2	16	10
65, 66, 68 (3 boats) ..	Normand ..	1884	108·2	10·7	6·4	1	49	500	20	2–1 prs.	2	16	10
70–74 (5 boats)	Normand ..	1885	108·2	10·7	6·5	1	50	500	20	2–1 prs.	2	16	10
75–82, 84–87, 89–109 (33 boats)	Cail, etc. ..	1885–92	114·7	10·6	6	1	54	525	20	2–1 prs.	2	16	10
111–125 (11 boats) ..	La Seyne, etc.	1885–90	114·7	10·6	6	1	54	525	20	2–1 prs.	2	16	10
130–132, 134–144 (14 boats)	Normand ..	1890–91	111·5	11·4	6	1	52·8	520	21	2–1 prs.	2	16	10
VEDETTE BOATS—													
(1 boat) (aluminium) ..	Poplar ..	1894	62·3	9·1	..	1	14	210	20·5	..	1	8	
A–I (9 boats)	Creusot ..	1890–94	62·4	8·9	4·9	1	15	210	16·5	..	1	9	
SUBMARINE—													
Aigrette †	Toulon ..	1904	117·6	12·9	8·3	1	172	200	10·5	..	..	20	..
Algérien	Cherbourg ..	1901	118	9·2	..	1	146	250	8–13	..	..	9	..
Alose	Toulon ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Anguille	Toulon ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Bonite	Toulon ..	1904	77	7·6	8·0	1	68	60	8	..	..	5	..
Castor	Rochefort ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Cigogne†	Toulon ..	1904	117·6	12·9	8·3	1	172	200	10·5	..	..	20	..
Dorade	Toulon ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Emeraude‡	Cherbourg ..	Bldg.	146	12·9	12·0	2	415	600	12	..	6	..	..
Espadon‡	Cherbourg ..	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Esturgeon	Toulon ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Farfadet	Rochefort ..	1901	135·8	9·5	9·5	1	185	..	8–12½	..	..	9	..
Français	Cherbourg ..	1901	118	9·9	..	1	146	250	8–13	..	..	9	..
Gnôme	Rochefort ..	1901	135·8	9·5	9·5	1	185	..	8–12½	..	..	9	..
Grondin	Toulon ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Guêpe (Nos. 1 & 2)	Cherbourg ..	Bldg.					44			..	..	..	..
Gustave Zédé	Toulon ..	1893	159	12·4	12·4	1	266	220	5–10	..	1	9	..
Gymnote	Mourillon ..	1888	56·5	5·11	6·0	1	30	55	4–6	..	2	4	..
Korrigan	Rochefort ..	1901	135·8	9·5	9·5	1	185	..	8–12½	..	..	9	..
Loutre	Rochefort ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..

* No. 293, Havre (Normand); Parsons turbines, 24 knots; No. 294, Brequet turbines. In all, in 1903, 34 boats were ordered—13 of the programme of 1902 and 21 of that of 1903.

† Submersible boats, Laubeuf type. ‡ See note on next page.

The Libellule, a turbine-motor vedette torpedo boat, long in hand at Havre (F. & C.), was launched February, 1905.

France—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
SUBMARINE—*contd.*			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Ludion	Cherbourg ..	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Lutin	Rochefort ..	1903	135·8	9·5	9·5	1	185	..	8–12½	..	..	9	..
Lynx	Cherbourg ..	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Méduse..	Rochefort ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Morse	Cherbourg ..	1899	118	9·0	9·0	1	144	360	8–12·3	..	1	9	..
Naïade	Cherbourg ..	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Narval‡	Cherbourg ..	1899	111·6	12·4	5·4	1	106–206	250	8–12	..	2	9	..
Opale‡	Cherbourg ..	B'dg.	146	12·9	12·0	2	415	600	12	..	6	..	..
Otarie	Rochefort ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Oursin	Rochefort ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Perle	Cherbourg ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Phoque..	Rochefort ..	1904	77	7·6	8·0	1	68	60	8	..	..	5	..
Protée	Cherbourg ..	1902	77	7·6	8·0	1	68	60	8	..	..	5	..
Rubis‡	Cherbourg ..	Bldg.	146	12·9	12·0	2	415	600	12	..	6	..	..
Saphire‡	Toulon ..	Bldg.	146	12·9	12·0	2	415	600	12	..	6	..	..
Silure‡	Cherbourg ..	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Sirène‡..	Cherbourg ..	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Souffleur	Toulon ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Thon	Toulon ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Topaze‡	Toulon ..	Bldg.	146	12·9	12·0	2	415	600	12	..	6	..	..
Triton‡..	Cherbourg ..	1901	111·6	12·4	5·4	1	106–200	250	8–12	..	2	10	..
Truite	Toulon ..	1903	77	7·6	8·0	1	68	60	8	..	..	5	..
Turquoise‡	Toulon ..	Bldg.	146	12·9	12·0	2	415	600	12	..	6	..	..
X ‡	Cherbourg ..	1904	122·8	10·2	7·6	2	168	220	10½	..	..	..	..
Y ‡	Toulon ..	Bldg.	142·8	9·10	9·10	1	213	250	11	..	..	..	..
Z ‡	Rochefort ..	1904	135·8	9·10	9·10	1	202	190	11	..	..	..	..
Omega	Toulon ..	Bldg.	160·6	13·9	9.0	1	301	330	11	..	2	20	..

‡ Submersible boats. The programme of 1902 included thirteen submarines (Q 38 to Q 42 and Q 61 to Q 68), but only two (38 and 39, Aigrette and Cigogne) were put in hand. The others of the class are the Eider, Macreuse, Grèbe, Cygne, Marabout, Héron, Pluvier (these to be built at Toulon), and the Pinguin, Pelican, Plongeon, and Vanneau (to be built at Cherbourg). Eighteen boats were in the list for 1903 (Q43 to Q60). In the list for 1904 were sixteen boats. Boats up to Q 60 are intended to be laid down in 1905.

Germany.

Name or Number.	Where built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
D 1, D 2 (2 boats)	Elbing ..	1887	180·6	21·6	9·8	2	250	1,800	19	6 1-pr. revs.	3	48	50
D 3, D 4 (2 boat)	Elbing ..	1888	184	21·8	9·6	2	300	2,000	20	4 6-pr. Q.F. 2 1-pr. revs.	3	48	90
D 5, D 6 (2 boats)	Elbing ..	1888–9	190 3	23	9 6	2	320	3 000	22½	4 6-pr. Q.F. 2 1-pr. revs.	3	48	90
D 7, D 8 (2 boats)	Elbing ..	1890	190·3	23	9·9	2	380	3,500	22½	6 Q F.	3		
D 9	Elbing ..	1894	197·0	24 3	9·9	2	380	4,500	26	6 Q.F.	3		
D 10	Chiswick ..	1898	211 9	19 6	8·1	2	310	5,800	28·5	5 3-pr. Q.F.	3	52	80
D 11, D 12	Chiswick ..	1900	218·6	20·9	8·7	2	333	7,000	31	1 12-pr. 5 6-p s.	2	59	40
S 90–101	Elbing ..	1900	200	23	8 9	2	350	6,000	27 5	3 3-pr. Q F.	3		
S 102–107	Elbing ..	1901	200	23	8 9	2	350	6,000	27·5	3 3-pr. Q.F.	3		
G 108–113	Kiel(Germania)	1901–2	200	23	8·9	2	350	6,000	29·2	3 3-pr. Q.F.	3	49	100
S 114–119	Elbing ..	1903	200	23	8·9	2	350	6,000	29·2	3 3-pr. Q F.	3	49	100
S 120–125	Elbing ..	1904 & bldg.	200	23	8·9	2	350	6,000	29·2	3 3-pr. Q.F.	3	49	100
S 126-131* S 132–137	Elbing .. Elbing ..	Bldg. Bldg.	205	23	..	2	420	6,000	30	3 6-pr.	3	56	100
Taku (ex Hai Ying)	Elbing ..	1898	183·7	21·0	..	2	280	6,000	30	6 3-prs.	2	..	67
FIRST CLASS—													
S 1—S 40 (40 boats) S 42—S 65 (24 boats)	Elbing .. Elbing ..	1883–92	121 150	15·7 15·6	6 7 6 7	..	85–88	900 1,600	20–22½	2 1-pr. revs.	2	..	17
S 66—S 73 (8 boats)	Elbing ..	1893	154·3	16·4	..	2	110 145	1,600	..	..	3		
S 74—S 81 (1 boats)	Elbing ..	1894	154 3	16·4	..	2	125	1,900	25	..	3		
S 82—S 87 (6 boats)	Elbing ..	1897–8	158·2	16·9	9·0	2	140	2,300	26	2 1-pr. revs.	3	..	32
G 88—G 89 (2 boats)	Kiel(German'a)	1898	154 3	16·5	..	..	160	2,500	26	2 mach.	3	22	
V 1—V 2 (2 boats) V 3—V 4 (2 boats) V 5—V 10 (6 boats)	Stettin .. Stettin .. Stettin ..	1884 1884 1884	124 6	.. .. ..	.. .. ..	.. .. ..	75 90	550 1,000	 19	.. .. ..	2 2 2		
G 1	Gaarden ..	1885	124·6	15·7	6·6	..	88	1,000	19	2 1-pr. revs.	2	17	
Y 1	Poplar ..	1884	120	12·5	5 5	1	65	650	19	2 1-pr. revs.	2	15	25
T 1, T 2 (2 boats)	Chiswick, &c.	1884	117·7	12·5	6 2	1	80	..	20	2 1-pr. revs.	2	15	22
H 1	Kiel (Howaldt)	1886	..	..	..	..	80	1,000	20·2	2 1-pr. revs.	2		
K 1	Kiel(Dockyard)	1887	118·1	13·4	5 9	..	85	1,030	22	2 1-pr. revs.	2	13	
SECOND CLASS—													
3 boats	..	1893	..	..	..	..	88	..	22				
2 boats	..	1893	..	..	..	..	90	..	23				

The Estimates of 1904 provide the final expenditure for the building of a division of torpedo boats and the initial outlay for a second division. Two submarine boats of the Holland type are completing; a small Howaldt boat has been built, and two others of special type are proposed. Provision is made in 1905 for the trial or purchase of boats. There are three Nordenfelt submarines, launched 1890–91.

* S 125 is provided with Parsons turbines.

Greece.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
6 boats	Stettin ..	1885	128	15·3	5·4	1	85	1,050	19	4 1-pr. revs.	..	20	20
6 boats	Poplar.. ..	1881	100	12	4·2	1	48	600	19	2 1-pr. revs.	2	12	9
4 boats	La Seyne ..	1880	72	13	5·5	1	52	225	..	..	..	..	10
5 boats	La Seyne ..	1881	89	11	3·1	1	35	500	17·5	..	..	..	5

Italy.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Fulmine	Sestri (Odero)	1898	200	20·4	5·4	2	298	4,800	28	1 12-pr. 3 6-pr. Q.F.	3	43	60
Lampo, Freccia, Dardo, Strale, Euro, Ostro	Elbing (Schichau)	1899 1901	196·8	21·3	5·8	2	320	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	60
Nembo, Turbine, Aquilone, Borea, Meteoro, Tuono	Naples (Pattison)	1901 1902	208	19·4	6·3	2	330	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	60
Zefiro, Espero	Naples (Pattison)	1904	208	19·4	6·3	2	330	6,000	30	1 12-pr. Q.F., 5 6-pr.	2	53	60
FIRST CLASS—													
5 boats (Aquila, Sparviero, Nibbio, Avvoltoio, Falco)	Elbing ..	1888	152	17·2	7·9	2	130	2,200	26·6	2 3-pr. Q.F., 1 1-pr. Q.F., 1 1-pr. rev.	3	24	40
Nos. 78, 79 (2 boats)	Venice ..	1887	135	14	5·3	2	110	1,600	24	1 1-pr. Q.F., 1 1-pr. rev.	3	20	24
Pellicano	Sestri (Odero)	1899	157·4	19	14·8	2	147	2,700	25	2 3-prs.	2	28	24
Condore	Sestri (Ansaldo)	1898	154·3	16·8	6·9	2	136	2,500	27	2 3-prs.	2	27	16
SECOND CLASS—													
Nos. 76, 77 (2 boats)	Poplar.. ..	1887	140	14	5	2	100	1,600	25	2 3-pr. Q.F., 1 1-pr. rev.	4	20	24
Nos. 78, 79 (2 boats)	Venice ..	1896	..	..	..	..	..	..	..	..	3	20	24
Nos. 80–104, 106–111 (31 boats)	Elbing and Italy ..	1887–88	127·7	15·6	6·8	1	85	1,000	22·5	2 1-pr. Q.	2	17	17
Nos. 112-116, 118-135 (23 boats)	Elbing and Italy ..	1889–92	127·7	15·6	6·8	1	85	1,100 1,200	23	..	2	17	17
No. 117	..	1895	131·2	16·4	..	1	85	1,000	..	2 1 pr. Q.F.	2	17	17
Nos. 136–146 (11 boats)	Italy	1893-94	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 147–153 (7 boats)	Italy ..	1894–5	131·2	16·4	..	1	85	1,000	22	2 1-pr. Q.F.	2	17	17
Nos. 60–75 (15 boats)	Elbing and Italy ..	1885–87	127·7	15·6	6·8	1	65	1,000	22·5	2 1-pr. Q.F.	2	17	17
THIRD CLASS—													
No. 22	Poplar.. ..	1882	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	7
No. 25	Poplar.. ..	1884	100	12·5	5·5	1	40	620	22	1 1-pr. rev.	2	11	7
Nos. 26–59 (34 boats)	Chiswick and Italy ..	1882–86	100	11·7	5·3	1	34	430	21·3	1 1-pr. rev.	2	11	7
Nos. 23, 24 (2 boats)	Chiswick ..	1881	92	10·5	4·9	1	33	470	21·8	1 1-pr. rev.	2	11	7
FOURTH CLASS.													
No. 1	Chiswick ..	1878	78·8	9·8	3	1	19	173	19	..	2	10	
No. 2	Poplar.. ..	1879	86	11	4·5	1	25	420	21	1 1-pr. rev.	2	10	
No. 18	Chiswick ..	1883	62·4	7·5	2·5	1	10	170	17	1 1-pr. rev.	2	10	
No. 11	Leghorn ..	1883	75·6	9·9	3·8	1	31	250	19·2		2	10	
SUBMARINE—													
Delfino	Spezia.. ..	1894	78·6	10·1	..	1	111	150	10–12	..	2	12	
Tritone	Spezia.. ..	1902	58·8	..	..	1	..	..	8·5	..	..	5	

The new Italian destroyers have Thornycroft water-tube boilers.

Sixteen 26-knot destroyers have been ordered from Messrs. Schichau, Elbing. Four destroyers are provided for in 1905.

The submersible boat, Glauco, is in hand at Venice, to have a surface speed of 14 knots and a range of 2,000 miles, and another boat of the type is to be built. A smaller submarine, designed by Signor Laurenti, is completing. The Venturo gave trouble at her trials at Spezia. Four submarines named Squalo, Narvalo, Otaria, and Tricheco are in hand.

Japan.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
DESTROYERS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Murakumo	Chiswick ..	1898											
Shinonome	Chiswick ..	1898											
Yugiri	Chiswick ..	1898	210·0	19·5	7·2	2	307	5,800	30 to 31	1 12-pr., 5 6-prs.	2	54	80
Shiranui	Chiswick ..	1899											
Kagerou	Chiswick ..	1899											
Usugumo	Chiswick ..	1900											
Shirakumo	Chiswick ..	1901	216·7	20·7	8·3	2	373	7,400	31	1 12-pr., 5 6-prs.	2	59	96
Asashio	Chiswick ..	1902											
Ikadsuchi	Poplar.. ..	1898											
Inadsuma	Poplar.. ..	1899	220·0	20 6	9·6	2	311	6,000	31	1 12-pr., 5 6-prs.	2	55	95
Akebono	Poplar.. ..	1899											
Sazanami..	Poplar.. ..	1899											
Oboro	Pop ar.. ..	1899	220·3	20·6	9·6	2	3:1	6,000	31 62	1 12-pr., 5 6-prs.	2	..	90
Niji	Poplar.. ..	1899	220·3	20.6	9·6	2	303	6,000	31 15	1 12-pr., 5 6 -prs.	2	..	90
Kasumi .. .. .. / Akatsuki	Pop'ar.. ..	1902	220·3	20·6	9·6	2	335	6,000	31	1 12-pr., 5 6-prs.	2	..	..
Asagiri	Yokosuka ..	19(2											
Hurusame	Yokosuka ..	1902	220·3	20·6	9·6	2	374	6,000	29	1 12-pr., 5 6-prs.	2	..	..
Murasame	Yoko-uka ..	1202											
Hayatori	Yokosuka ..	1903											
FIRST CLASS—												..	
Kotaka	Poplar.. ..	1886	170	19·6	5		190	1,400	19	4 mach.	6		
Hayabusa..	Norman l ..	1898											
Kasasagi	Normand ..	1899	147·7	16·0	8 2	2	150	4,200	30	1 6-pr., 2 3-prs.	3	26	30
Manadzuru	Normand ..	1899											
Ch:dori	Normand ..	1900											
Shirat ka..	Elbing ..	1899											
Aoataka	Kure	1903											
Hato	Kure	1903											
Hib ri	Kure	1903											
Kari	Kure	1903											
Kiji	Kure	1903	147·7	16·0	8·2	2	150	4,200	27	1 6-pr., 2 3-prs.	3	26	30
Tsubame	Kure	1903											
Hashitaka	Kawasaki ..	1902											
Kamone	Kure	1904											
Otori	Kawasaki ..	1904											
Sagi	Kure	1902											
Uzuri	Kure	1902											
Fukuriu	Kiel	1895	..	..	..	..	115	..	..	..	..	..	..
SECOND CLASS—													
2 boats*	Kobe	1901	..	..	..	..	83	..	..	..	..	..	..
10 boats	Poplar.. ..	1900	152·6	15·3	7·9	..	..	1900	27	2 3-prs	3	..	36
16 boats	Elbing ..	1891-9	..	..	..	..	..	..	..	..	..	..	..
13 boats	Creusot ..	1889	114·7	10·6	6	2	56	525	20	2 1-prs.	..	16	50
7 boats	Kobe	1889	114·7	10·6	6	1	56	525	20	2 1-prs.	..	16	
4 boats	Poplar.. ..	1879	100	12·5	..	1	40	620	20	..	..	..	
1 boat (No. 24) ..	Normand ..	1891	118	13·1	6·9	1	80	1,200	23	2 1-prs.	2	21	10
2 boats	Normand ..	1898	121·4	13·6	8·6	1	86	1,800	27	1 3-pr.	2	..	10

* Materials sent out by Schichau (Nos. 60 and 61).

It is believed that the Japanese have lost one or two destroyers and one or more torpedo boats in the war. In Japanese yards 28 destroyers and a number of torpedo boats are stated to be in hand. About 13 submarine boats are understood to have been bought in the United States.

Mexico.

Mexico has four first-class boats building or projected.

Norway.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
FIRST CLASS—			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
Lyn	..	1882	94·2	9·7	2·5	1	36	430	18	..	1	..	3
Od	..	1882	97·5	11	5·6	1	40	450	18	..	1	..	3
Orm, Otter (2 boats)	..	1887	108·2	12·2	5·6	1	40	500	20	..	2	..	3
Pil, Rask (2 boats)..	..	1887	101·7	11·8	5·6	1	40	500	20	..	2	..	3
Snar	..	1887	104·9	11·8	5·6	1	40	500	20	..	2	..	
Springer	..	1887	97·5	11·6	5·6	1	40	450	19	..	2	..	
Varg (8), Raket (9)	Christiania..	1894	111·5	12·4	..	1	43	..	..	..	2	..	..
Hval, Delfin, Hai (3 boats)	Elbing ..	1896	128·0	15·0	6·9	1	84	1,100	24·5	2 1·4-in, Q.F.	2	..	..
Storm, Brand, Trods	Christiania..	1899	128·0	15·0	..	1	84	1,100	23	2 1·4-in. Q.F.	2		
Laks, Sild, Sael, Skrei	Christiana ..	1900	128·0	15 0	6·9	1	84	11,000	23	2 1·4-in.	2	..	..
Kjeck, Hvas, Dristig, Kvik, Djerv, Blink, Glint, Hauk, Falk	Christiana ..	1898 1903	111·5	14·5	6 3	1	65	650	19	2 1·4-in.	2	..	..
SECOND CLASS—													
Rasp	Chiswick ..	1873	58	7·5	3·9	1	16	..	18	..	2		
Ulven	..	1878	56	..	..	1	16	..	9	..	sp.		
Ore, Ravn	Copenhagen	1904	..	..	..	..	20	..	23	..	..		

Netherlands.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
Ardjoeno	Poplar.. ..	1886	125	13	6	1	83	80	21	2 1-prs.	2	16	10
Batok	Amsterdam	1887	125	13	6·9	1	83	725	20	2 1-prs.	2	16	10
Cycloop	Amsterdam	1887	125	13	6·9	1	83	680	20	2 1-prs.	2	16	10
Dempo	Amsterdam	1887	125	13	6·9	1	83	760	20	2 1-prs.	2	16	10
Empong	Poplar.. ..	1888	128	13	6·2	1	91	1,100	24·1	2 1-prs.	3	16	15
Etna	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Foka	Amsterdam	1888	128	13	6·2	1	90	1,000	22·1	2 1-prs.	3		
Goentoer	Amsterdam	1888	128	13	6·2	1	90	950	21	2 1-prs.	3		
Habang	Amsterdam	1888	128	13	6·2	1	90	930	21·7	2 1-prs.	3		
Hekla	Poplar.. ..	1882	100	12·6	5·6	1	45	550	21·5	2 1-prs.	2	16	7
Idjen	Amsterdam	1889	128	13	6·2	1	90	840	20·6	2 1-prs.	3		
Krakatau	Amsterdam	1889	128	13	6·2	1	90	750	19·1	2 1-prs.	3		
Lamongan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Makjan	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Nobo	Amsterdam	1890	104·5	13·3	5·2	1	50	790	20·7	2 1-prs.	2		
Scylla	Poplar.. ..	1900	130	13·6	6·0	1	77	1,200	24.3	2 1-prs.	3	18	20
Hydra	Poplar.. ..	1900	130	13 6	6·0	1	77	1,200	24 4	2 1 prs.	3	18	20
Ophir	Poplar.. ..	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-p's.	2	25	36
Pangrango	Poplar.. ..	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Rindjani	Poplar.. ..	1901	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Smeroe	Fijenoord ..	1904	152·6	15·3	7 9	1	130	1,900	27	2 3-prs.	2	25	36
Tangka	Fijenoord ..	1904	152 6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Wajang	Fijenoord ..	1904	152·6	15·3	7 9	1	130	1,900	27	2 3-prs.	2	25	36
Minotaurus, Python	Flushing ..	Bldg.	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
Sphinx and another..	Flushing ..	Bldg.	152·6	15·3	7·9	1	130	1,900	27	2 3-prs.	2	25	36
4 Ophir type	..	I ro.	152·6	15·3	7·9	1	130	1,900	27	2 2-prs.	2	25	36
SECOND CLASS—													
Nos. 1, 2, 4–20 (19 boats)	Chiswick, etc.	1878–86	76 / 79	10·3	5·2	1	29	250	18	1 1-pr.	2 sp	..	3
Nos. 3,21,2 (3 boats)	..	1890	83·6	10·5	5·1	1	37	460	17·9	1 1-pr.	1	..	3
1 boat	East Cowes	1883	45·5	9·7	..	1	..	..	12	1 mach.	1		
INDIAN FLEET—													
Cerberus	Flushing ..	1888	125	13	6·9	1	83	912	21·2	2-1 prs.	..	16	
1 boat	..	1891											
3 boats	..	1893–94	125	..	..	..	83	..	21·5	..	2		

All the Poplar destroyers have Yarrow water-tube boilers, and the later ones are fitted for the consumption of oil fuel.
One submarine boat (Holland type) to be purchased.

Portugal.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
5 boats (5–9)	Elbing ..	1890–92											
Espadarte (1)	Poplar.. ..	1881	85	11	5	1	31	450	19·7	2 mach.	2	10	10
Nos. 2, 3, 4 (3 boats)	Poplar.. ..	1886	120	12·5	5·5	1	60	700	20	2 mach.	2	16	18
Fulminante	Blackwall ..	1880	75	15	2·6	2	40	150	11·5	2 mach.	..	..	8
Mineiro	Lisbon ..	1893	..	..	..	..	..	..	12				
SUBMARINE—													
Plongeur	Lisbon ..	1892	72·1	11·5	..	..	100	..	6		4	6	

Roumania.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet	Feet.		Tons.		Knots.				Tons.
FIRST CLASS—													
Naluka	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
Sborul	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	12
Smeul	Havre	1888	120·7	11·3	6·9	1	56	578	21	1 1-pr. rev.	2	..	14
SECOND CLASS—													
Soimul	Poplar.. ..	1882	63	8	3	1	12	150	16·5	..	..	8	
Vulturul	Poplar.. ..	1882	63	8	3	1	12	150	16·5	..	..	8	

Russia.

Name or Number. N.B.—With one or two exceptions the 1895-1902 destroyers left Cronstadt for the Far East.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
BALTIC SEA.			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Prytki	Poplar.. ..	1895	190	18·6	7.0	2	240	4,400	29.7	1 12-pr,3 3-pr	2		
Revy, Retivy, Ryany, Rezviyi, Prosorlivy, Pilky, Ridny, Posluchny, Protchny, Poratsaiuschy, Prontsiteliny, Podvitsny	Abo, Ishora & Nevsky ..	1898	196·9	18·4	11·5	1	240	3,800	27	1 12-pr,3 3-pr	2	55	53
Buini, Bedovi, Bravi, Blestiaschy, Bezumprechni, Bodry, Bystri, Vidny ..	Nevsky and Ishora ..	1900–2	196·9	18·4	11·5	1	350	6,000	27	1 12-pr,5 3-pr	3		
Gromki, Grozni, Gromiashtchi ..	St. Petersburg	1904	196·9	18·4	11·5	1	350	6,000	27	1 12-pr,5 3-pr	3		
Tverdy, Totschny, Trevozhny	Abo	Bldg.	196·9	18·4	11·5	1	240	6,000	27	1 12-pr,5 3-pr	3		
FIRST CLASS—													
Aspen	Ishora.. ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Abo	Elbing ..	1886	128	15·7	7·5	1	87	900	22·2	4 1-pr. revs.	2	13	17
Bjerke	Putiloff ..	1890	136·5	13	7·8	..	81	1,100	21				
Dago	Abo	1891	152	13	8·3	..	100	1,000	19				
Domeness	Putiloff ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Eckness	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Hapsal	Putiloff ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Hogland	Ishora.. ..	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Kotka	Abo	1891	152	13	8·3	..	100	1,000	19				
Kotlinj	St. Petersburg	1885	124·2	12·9	5·9	2	67	500	16·5	2 1-pr. revs.	2	16	15
Kronschlot	Ishora.. ..	1891	152	13	8·3	..	100	1,000	19				
Lachta	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Libawa	Elbing ..	1886	128	15·7	7·5	1	87	1,000	22	4 1-pr. revs.	2	13	17
Louga	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Moonsund	Putiloff ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Nargen	Ishora.. ..	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Narwa	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Pernoff	Normand ..	1892	137·9	14·9	6·8	2	120	1,600	25	2 3-prs.	2	26	16
Rochensalm	Putiloff ..	1890	136·5	13	7·8	..	81	1,100	21				
Seskar	Ishora.. ..	1891	152	13	8·3	..	100	1,000	19				
Sestoretsk..	Normand ..	1894	118	13·2	8·6	1	80	1,300	24	2 1-prs.	2	21	10
Tosna	Putiloff ..	1893	127·9	15·7	6·9	1	98	1,250	21	..	2	13	17
Transund	Ishora.. ..	1895	127·9	15·7	6·9	1	98	1,250	21	..	2	..	17
Viborg	Clydebank..	1886	144·5	17	8·1	2	126	1,400	20	2 3-pr. revs.	3	24	45
Vindawa	Elbing ..	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Vzriw	St. Petersburg	1877	118	16	10·9	1	160	800	14·5	4 Q.F.	1	18	16
8 boats	St. Petersburg	1894	128	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
2 boats	Putiloff ..	1894	138	14·7	9·9	2	118	..	25	2 mach.	2	26	
2 boats	St. Petersburg	1896	128	16	6·9	2	85	1,200	22	2 1-prs.	2	13	17
6 boats	St. Petersburg	1897	138	14·7	9·9	2	120	..	25	..	2	26	
8 boats	Nevsky ..	1898	..	..	..	..	118						
SECOND CLASS—													
21 boats (Galka class)	Elbing and Russia ..	1880 &c.	74·7	8·9	5	1	30	220	16	..	2	14	3
21 boats (Woron class)		..	66	11·1	..	1	..	260	17				
1 boat	Poplar.. ..	1888	60	8·5	3	1	16	240	17·5	..	2	..	1
BLACK SEA.													
DESTROYERS—													
Zavidni, Zavetni, Zharki, Zhutki, Zhivoi, Zhivulka	Nicolaieff ..	1903-4	210	21·2	7	2	350	5,500	27	1 12-pr,5 3-pr	2		
Stremitelini, Strogi, Smetlivy, Svirepy†	Abo	1901	190·4	18·5	11·5	2	240	3,800	27	1 12-pr,3 3-pr	2	..	60
Zadorni, Zorki, Zvonki	Nicolaieff ..	1903	210	21·2	7	2	350	5,500	27	1 12-pr,5 3-pr	2		
FIRST CLASS—													
A. B. C. (3 boats) ..	Nicolaieff ..	1893	126	..	..	..	81	..	21				
Adler..	Elbing ..	1890	152·0	17·2	7·9	2	130	2,200	27·4	2 1-prs.	3	24	40
Anakria	Elbing ..	1890	128·0	16	6·9	1	85	1,200	22	2 1-prs.	2	13	17
Anapa	Odessa.. ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Aitodorj	Odessa.. ..	1891	126	13	8·5	1	81	1,100	21	2 1-pr. revs.	2	13	
Batoum	Poplar.. ..	1880	100	12·5	5·5	1	40	500	22	2 1-pr. revs.	2	12	9
D. E. (2 boats) ..	Sebastopol ..	1893	128	..	..	..	85	..	22				
Gagri	Claparède ..	1883	120·6	13·3	7	1	78	600	18	2 1-pr. revs.	2	13	12
Gelendshik	La Seyne ..	1883	122·7	12·4	6·2	1	73	560	18	2 1-pr. revs.	2	13	11
Ismail	Nicolaieff ..	1886	128	15·7	7·5	1	87	900	20	2 1-pr. revs.	2	13	17
Itzvar	Odessa.. ..	1891	..	..	..	..	81	1,100					
Kodor	Elbing ..	1886	128	15·7	7·5	1	87	900	21	4 1-pr. revs.	2	13	17
Kilia	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Novorossisk	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Poti	Normand ..	1883	124·8	11·0	7·0	1	62	550	18	2 1-pr. revs.	2	13	
Reni	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
Sookhoum	Chiswick ..	1883	113	12·5	6	1	64	700	19.5	2 Nords.	2	13	10
Tchardak	Elbing ..	1886	128	15·7	7·5	1	87	900	20	4 1-pr. revs.	2	13	17
Yalta..	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
3 boats	Elbing ..	1886	128	15·7	7·5	1	87	900	22	4 1-pr. revs.	2	13	17
4 boats	Nicolaieff ..	Bldg.	..	..	..	..	..	..	..	..	..	..	..

Eleven destroyers to be built at Havre, Grozovoi type, 300 tons, and ten others in Germany.

† These destroyers proceeded from Cronstadt to Sebastopol, unarmed, January, 1903, passing the Dardanelles by consent of the Porte.

A small submarine boat from the plans of Lieut. Kolbasieff and Engineer Kuteinikoff has received the name of Matros Piotr Koshka. Bubnoff's submarine, the *Delfin* (77 ft., 175 tons), made a successful run of 36 hours from Kronstadt to Bjoerkoe, 26 hours submerged. It is stated that six more are to be built. There are two submersibles, 80 ft. long, designed by Drzewiecki.

Russia—*continued.*

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
FAR EAST.													
DESTROYERS—													
Bditelni, Bespochtchadni, Bestrachni, Beschumni (4 boats)	Elbing ..	1899	196·9	18·4	11·5	1	350	6,000	27	1 12-pr, 5 3-pr	2		
Boevoi	Birkenhead	1899	213	21·5	12·9	1	370	6,000	28				
Grozovoi, Vlastni ..	Havre (F. & C.)	1900–2	186·0	20·8	10·3	2	300	5,000	28	1 12-pr, 5 3-pr	2	..	80
Boiki, Burni	Nevsky and Ishora ..	1900-2	196·9	18·4	11·5	1	350	6,000	28	1 12-pr, 5 3-pr			
Vnushitelni	Havre (F. & C.)	19 0–2	186·0	20·8	10·3	2	300	5,000	27	1 12-pr, 5 3-pr	2	..	80
Vnimatelni, Vuinoslivni	Havre (Normand) ..	1900–1	186·0	20·8	10·3	2	300	5,000	27	1 12-pr, 5 3-pr	2	..	80
Silni, Serdity, Smely, Storosevoi, Steregustchi, Skory, Strashni, Stroini, Stratni, Reshitelni, Ratsiastchi, Rastoropny	Port Arthur	1902 1893	190·3	18·9	11·6	2	350	3,8?0	26	1 12-pr, 3 3-pr	2	..	..
Lieut. Burukoff ..	Elbing ..	1898	193·7	21·0	..	2	280	6,000	35	6 3-pr. Q.F.	2	..	67
Borgo	Abo	1890	136·5	13	7·8	..	81	1,100	21				
Forel	..	..	71·5	6·5	3·3	1	23	220	16				
Jantchiche	Elbing	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
N.	..	1893	152·5	16·8	..	..	140	2,200	26·5	2 1-pr. revs.	3	24	40
Podorosnik	..	..	71·5	6·5	3·3	1	23	220	16				
Revel	Normand ..	1886	151	12·5	8·4	1	102	800	20	2 1-pr. revs.	2	23	15
Sisik	..	..	71·5	6·5	3·3	1	23	220	16				
Skorpion	..	..	71·5	6·5	3·3	1	23	220	16				
Sootchena	Elbing	1887	128	15·7	11·5	..	87	970	19	4 1-pr. revs.	2	13	17
Sterliad	..	..	71·5	6·5	3·3	1	23	220	16				
Strauss	..	..	71·5	6·5	3·3	1	23	220	16				
Sunguri (*ex* Hogland)	Abo	1890	152	16	7·9	2	140	1,800	22				
Sweaborg	Normand ..	1886	151	12·5	8·4	1	102	800	20	2 1-pr. revs.	2	23	15
Ussuri (*ex* Nargen)	Abo	1890	152	16	7·9	2	140	1,800	22				

Of the Russian destroyers named in the above list as being in the Far East, the Grozovoi is disarmed at Shanghai, and the Bespochtchadni, Beschumni, and Bestrachni are at Kiao-chau. The Reshitelni took refuge at Chefoo, and was cut out by the Japanese. At the same port the Ratstoropny was blown up by her own commander. All the others have either been sunk in action or have been destroyed or captured by the Japanese at Port Arthur. The flotilla of destroyers in the above list has practically ceased to exist.

Spain.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons.
DESTROYERS—													
Terror	Clydebank ..	1896	220	22	5·6	2	200	6,000	28	2 12-pr. 2 6-pr. 2 1-pr.	2	67	100
Audaz .. .. .. / Osado .. .. .. / Proserpina	Clydebank ..	1897	225	25·6	5·8	2	400	7,500	30	2 14-pr. 2 6-pr. 2 1-pr.	2	70	90
FIRST CLASS—													
Acevedo	Chiswick ..	1885	117·7	12 5	6·2	1	63	660	20·1	2 mach.	2		
Ariete	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	26·1	4 3-pr. Q.F.	2	..	25
Azor	Poplar	1887	134·5	14	6	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Bustamente	Normand ..	1887	126	10·9	..	..	63	800	..	3 3-prs.	2		
Habana	Chiswick ..	1887	127·5	12·5	6	1	59	730	21·3	1 mach.	2		
Halcón	Poplar	1887	134·5	14	..	1	108	1,600	24	4 3-pr. Q.F.	3	23	25
Julian Ordoñez ..	Chiswick ..	1885	117·7	12·5	6·2	1	65	660	20·1	2 1-in. Nord.	2		
Orion	Gaarden ..	1885	125–	15·5	3·5	1	85	1,000	21·5	2 1-pr. revs.	2	18	16
Rayo	Chiswick ..	1887	147·5	14·6	4·9	2	97	1,600	25·5	4 3-pr. Q.F.	2	..	25
Barcelo	..	1886	117·7	12·5	6·2	1	63	660	20	2 mach.	2		
VEDETTE BOATS—													
3 boats	East Cowes	1892	60	9·3	..	..	..	..	18·3				
SUBMARINE—													
Peral	Carraca ..	1889	70	8·5	..	2	87	60	10				

Sweden.

Torpedo Boats.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Destroyer—													
Mode	Poplar.. ..	1902	220·3	20 6	8·9	2	400	6,820	32·4	1 12-pr. 5 6-prs.	2	55	95
Hayem	Chiswick ..	Bldg.	216·7	20·0	7·2	2	350	7,400	30·5	1 12 pr. 5 6-prs.	2	59	96
First Class—													
Komet	Elbing ..	1896	128	15·9	6·11	1	92	1,056	23·0	2 1·9-in. Q.F.	2	16	17
Blixt..	Carlskrona..	1898	128	15·9	6·11	1	92	1,260	23·5	2 1·9 in Q.F.	2	18	17
Meteor	Carlskrona..	1899	128	15·9	6·11	1	92	1,330	23·8	2 1·9-in. Q.F	2	18	17
Stjerna	Carlskrona..	1899	128	15·9	6·11	1	92	1,250	23·4	2 1·9-in. Q.F.	2	18	17
Orkan	Carlskrona..	1900	128	15·9	6·11	1	92	1,250	23·5	2 1·5 in. Q.F.	2	18	17
Vind..	Carlskrona..	1900	128	15 9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Bris	Carlskrona..	1900	128	15·9	6·11	1	92	1,250	23 5	2 1·5-in. Q.F.	2	18	17
Virgo	Carlskrona..	1902	128	15·9	6·11	1	92	1,250	23 5	2 1·5-in. Q.F.	2	18	17
Mira..	Carlskrona..	1902	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Orion .. .. .. / Sirius .. .. .. / Kapella	Carlskrona..	1903	128	15·9	6·11	1	92	1,250	23·5	2 1·5-in. Q.F.	2	18	17
Pleiad	Carlskrona..	Bldg.	125	15	6·6	1	96	1,900	26	2 1·5-in. Q.F.	2	18	—
No. 1..	Chiswick ..	1884	113·2	12·2	6·3	1	65	620	18·5	1 mach.	2	16	11
2 boats (3 and 5) ..	Stockholm ..	1887	114·2	12·6	6·7	1	67	620	18·5	1 mach.	2	16	15
No. 7..	Stockholm ..	1887	114·2	12·6	6·7	1	67	620	18·7	1 mach.	2	16	15
2 boats (9 and 11) ..	Carlskrona..	1894	126·8	13·11	7·7	1	86	850	19·5	2 mach.	2	16	15
Second Class—													
No. 61	Stockholm ..	1882	91·6	11·8	5·7	1	40	350	16·0	1 mach.	1	14	9
No. 63	Chiswick ..	1883	100·1	11·10	5·11	1	45	420	19·0	1 mach.	2	14	7
No. 65	Stockholm ..	1885	100·1	11·10	5·11	1	45	420	19·0	1 mach.	2	14	9
No. 67	Stockholm ..	1886	100·9	11·10	6·1	1	46	430	19.2	1 mach.	2	14	9
No. 69	Stockholm ..	1886	100·9	11·10	6·1	1	46	450	19·9	1 mach.	2	14	9
No. 71	Stockholm ..	1887	103·4	11·10	6·7	1	58	460	18·6	1 mach.	2	14	9
No. 73	Stockholm ..	1887	103·4	11·10	6·7	1	58	460	18·6	1 mach.	2	14	9
No. 75	Stockholm ..	1892	100·5	11·6	6·3	1	49	460	18·9	1 mach.	2	14	9
No. 77	Carlskrona..	1891	100·5	11·6	6·3	1	49	460	18·9	1 mach.	2	14	9
No. 79	Stockholm ..	1902	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 81	Stockholm ..	1902	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 83	Stockholm ..	1903	104·0	12·5	6·1	1	49			1 1·5-in. Q.F.	2	14	
No. 85	Stockholm ..	1903	104·0	12 5	6 1	1	49			1 1·5-in. Q.F.	2	14	
Third Class—													
Nos. 141, 143, 145, 147, 149 (5 boats) ..	Stockholm ..	1879 / 1890	55·0	10·7	4·1	2	21	80	10	..	2	..	1·5
Submarine—													
Enroth	Stockholm ..	1902	82·0	13·0	11·6	2	146	100	12 11	..	1	..	..
Hajen	Stockholm ..	1903	65·0	11·6	..	..	120	200	10–7	..	..	..	..

Provision is made for two destroyers and five large and nine small torpedo boats.

Turkey.

Name or Number.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament.	Torpedo Tubes.	Complement.	Coal Capacity.
			Feet.	Feet.	Feet.		Tons.		Knots.				Tons
Destroyers—													
Berk-Efshan	Gaarden ..	1894	187	21·6	..	2	270	1,200	25	6 1-pr. revs.	2		
Tajjar	Gaarden ..	1894	187	21.6	..	2	270	..	25	6 1-pr. revs.	2		
First Class—													
Eliagot, Ac-Hisar ..	Sestri Ponente	1901	165·8	18·6	4·5	..	165	2,200	27				
7 boats	Sestri Ponente	Bldg.	165·8	18 6	4·5	..	165	2,200	24				
A. B...	Sestri Ponente	1901	166	18·6	4·0	2	145	2,400	26	2·1 pr.	2	..	16
Edjder (No. 10) ..	Gaarden ..	1890	152·7	18·9	7·4	2	150	2,200	23	5 3-prs. Q.F.	2		
1 boat	Constantinople	1889	140	16	6·9	2	120	1,800	23	5 1-pr. revs.	2		
5 boats	Gaarden ..	1889–90	126·7	15·4	8·6	1	85	1,300	22	2 1-pr. revs.	2	21	8
Timsah	London ..	1887	126	15	..	..	..	..	21·7				
5 boats	Elbing ..	1886	120·3	16·2	..	..	85	900	21	2 Nords.	2	20	10
4 boats	Constantinople	1886–89	100·3	11·8	5·5	1	42	550	19·5	2 mach.			
Tewfik	Normand ..	1885	100·7	13	5·5	1	42	550	20				
2 boats	La Seyne and Constantinople	1885	100·7	13	5·5	1	42	550	20·3	2 Nords.			
2 boats	Teddington	1887	124	15	..	..	..	..	22				
2 boats	Kiel	1892	127	..	..	..	..	..	22				
Submarine—													
Abdul Hamid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8
Abdul Medjid	Chertsey ..	1886	100	12	..	3	160	250	10	2 mach.	1	..	8

United States.

Name.	Where Built.	Launched.	Dimensions. Length.	Beam.	Draught.	Number of Screws.	Displacement.	Indicated Horse-Power.	Maximum Trial Speed.	Armament. Guns.	Torpedo Tubes.	Complement.	Maximum Coal Capacity.
			ft. in.	ft. in.	ft. in.		Tons.		Knots.				Tons.
DESTROYERS—													
Bainbridge ..	Philadelphia	1901	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.*	2	64	139
Barry	Philadelphia	1902	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	139
Chauncey.. ..	Philadelphia	1901	245 0	23 7	6 6	2	420	8,000	29	2 12-pr., 5 6-pr.	2	64	139
Dale	Richmond ..	1900	245 0	23 7	6 6	2	420	8,000	28	2 12-pr., 5 6-pr.	2	64	139
Decatur	Richmond ..	1900	245 0	23 7	6 6	2	420	8,000	28	2 12-pr., 5 6-pr.	2	64	139
Hopkins	Wilmington	1902	244 0	24 6	6 0	2	408	7,200	29	2 12-pr., 5 6-pr.	2	64	150
Hull	Wilmington	1902	244 0	24 6	6 0	2	408	7,200	29	2 12-pr., 5 6-pr.	2	64	150
Lawrence.. ..	Quincy, Mass.	1900	242 3	22 3	6 2	2	400	8,400	30	2 12-pr., 5 6-pr.	2	64	115
Macdonough ..	Quincy, Mass.	1901	242 3	22 3	6 2	2	400	8,400	30	2 12-pr., 5 6-pr.	2	64	115
Paul Jones ..	San Francisco	1900	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Perry	San Francisco	1900	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Preble	San Francisco	1901	245 0	23 7	6 6	2	420	7,000	29	2 12-pr., 5 6-pr.	2	64	139
Stewart	Morris Heights	1902	245 0	23 7	6 6	2	420	7,000	29·3	2 12-pr., 5 6-pr.	2	64	139
Truxtun	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Whipple	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Worden	Baltimore ..	1901	248 0	23 3	6 0	2	433	8,300	30	2 12-pr., 5 6-pr.	2	64	232
Bagley	Bath	1900	157 0	17 0	4 7	2	167	3,920	28	3 3-pr.	3	29	..
Bailey	Morris Heights	1899	205 0	19 0	6 0	2	235	5,000	30	4 6-pr.	2	..	20
Barney	Bath	1900	157 0	17 0	4 7	2	167	3,920	28	3 3-pr.	3	29	..
Biddle	Bath	1900	157 0	17 0	4 7	2	167	3,910	28	3 3-pr.	3	29	..
Blakely	Boston ..	1902	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
De Long	Boston ..	1901	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Du Pont	Bristol, R.I.	1897	175 0	17 8	4 8	2	165	3,400	28·58	4 1-pr.	3	32	76
Farragut	San Francisco	1898	213 6	20 8	6 0	2	273	5,600	30	4 6-pr.	2	..	76
Foote..	Baltimore ..	1896	160 0	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
Goldsborough ..	Portland, Ore.	1902	194 8	20 5	5 0	2	247·5	5,880	30	4 6-pr.	2	..	131
Nicholson ..	Elizabethport	1902	174 6	17 0	4 6	2	174	3,500	26	3 3-pr.	3	29	..
O'Brien	Elizabethport	1902	174 6	17 0	4 6	2	174	3,500	26	3 3-pr.	3	29	..
Porter	Bristol, R.I.	1896	175 0	17 8	4 8	2	165	3,800	28·63	4 1-pr.	3	32	76
Rodgers	Baltimore ..	1896	160 0	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
Rowan	Seattle, Wash.	1898	170 0	17 0	5 11	2	182	3,200	26	4 1-pr.	3	32	60
Shubrick	Richmond ..	1899	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Stockton	Richmond ..	1899	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Stringham ..	Wilmington	1899	225 0	22 0	6 6	2	340	7,200	30	7 6-pr.	2	..	120
Thornton	Richmond	1900	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Tingey	Baltimore ..	1903	175 0	17 6	4 8	2	165	3,000	26	3 3-pr.	3	29	70
Wilkes	Morris Heights	1901	175 0	17 6	4 8	2	165	3,000	26·25	3 3-pr.	3	29	70
Winslow	Baltimore ..	1897	160 0	16 1	5 0	2	142	2,000	24·5	3 1-pr.	3	24	44
SEA-GOING—													
Cushing	Bristol, R.I.	1890	138 9	14 3	4 11	2	105	1,720	22·5	3 1-pr.	3	23	36
Davis	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	22·5	3 1-pr.	3	..	..
Dahlgren	Bath	1899	147 0	16 4	4 7	2	146	4,200	30·5	4 1-pr.	2	..	32
Ericsson	Dubuque, Iowa	1894	149 7	15 6	4 9	2	120	1,800	24	4 1-pr.	3	23	35
Fox	Portland, Ore.	1898	146 0	15 4	5 4	2	132	1,750	22·5	3 1-pr.	3	..	..
Morris	Bristol, R.I.	1898	138 3	15 6	4 1	2	105	1,750	24	3 1-pr.	3	..	28
Somers	Schichau, Elbing ..	1898	149 3½	17 5	..	2	145	..	..	..	..	..	..
T. A. M. Craven	Bath	1899	147 0	16 4	4 7	2	146	4,200	30·5	4 1-pr.	2	..	32
THIRD CLASS—													
Gwin..	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	20·88	1 1-pr.	2	..	8
Mackenzie ..	Philadelphia	1898	99 3	12 9	4 3	1	65	850	20	1 1-pr.	2	..	15·3
McKee	Philadelphia	1898	99 3	12 9	4 3	1	65	850	19·82	2 1-pr.	2	..	..
Talbot	Bristol, R.I.	1897	99 6	12 6	3 3	1	46	850	21·15	1 1-pr.	2	..	8·8
SUBMARINE—													
Adder	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Grampus ..	S. Francisco	1902	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Holland	Elizabethport	1896	54 0	10 3	..	1	74	150	8	1 dynamite	1	5	..
Moccassin ..	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Pike	S. Francisco	1902	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Plunger	Elizabethport	1902	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Porpoise	Elizabethpor	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..
Shark	Elizabethport	1901	63 4	11 9	..	1	120	160	7—8	..	1	..	..

* Guns of destroyers of this class are Driggs Semi-Automatic Quick-Firers.

Six destroyers and six torpedo boats are intended to be laid down in 1905.

With the exception of the Lawrence, Macdonough, and Stewart, all the destroyers in the first alphabetical list have Thornycroft water-tube boilers. The Farragut, Goldsborough and Stringham have also boilers of this type.

The submarine Fulton, of the Holland type, built experimentally by the Holland Company, was launched June, 1901. Two submarines of 105 tons and two of 81 tons are to be built by the Fore River Company.

PLANS

OF

BRITISH AND FOREIGN SHIPS

SCALE FOR FULL-PAGE PLATES
50 FEET TO THE INCH.
0 10 20 30 40 50 100 150

SCALE FOR HALF-PAGE PLATES.
100 FEET TO THE INCH.
0 10 20 30 40 50 60 70 80 90 100 200 300

GREAT BRITAIN.

BATTLESHIPS.

"Lord Nelson"
"Agamemnon"

See page 238.

"Africa."
"Britannia."
"Hibernia."
"Hindustan."

"King Edward VII."
"Dominion."
"Commonwealth."
"New Zealand."

See page 234.

PLATE 1.

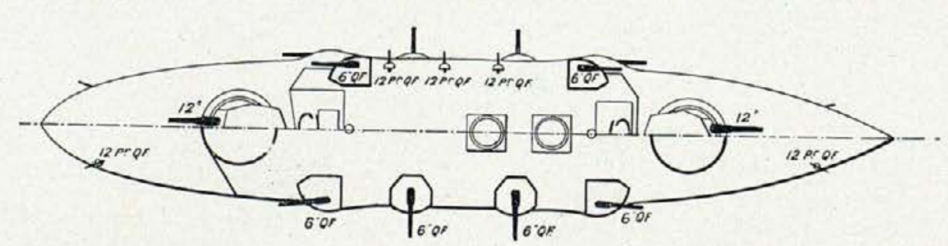
GREAT BRITAIN.

BATTLESHIPS.

"Triumph"
"Swiftsure"

See page 241.

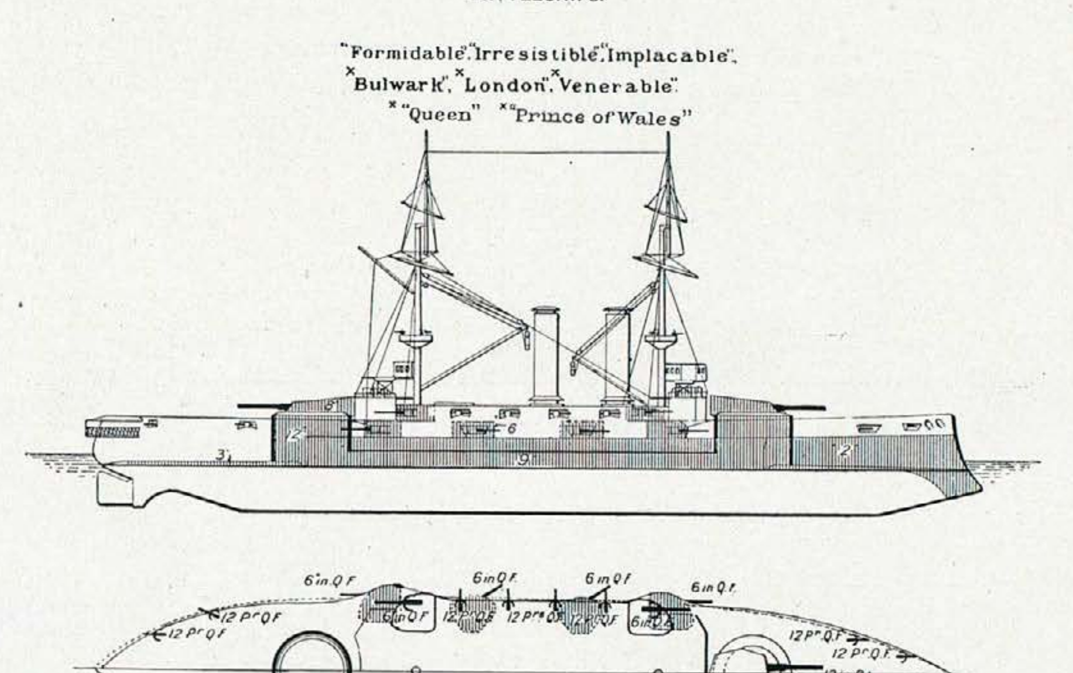
Duncan.
Cornwallis.
Russell.
Exmouth.
Montagu.
Albemarle.



See page 236.

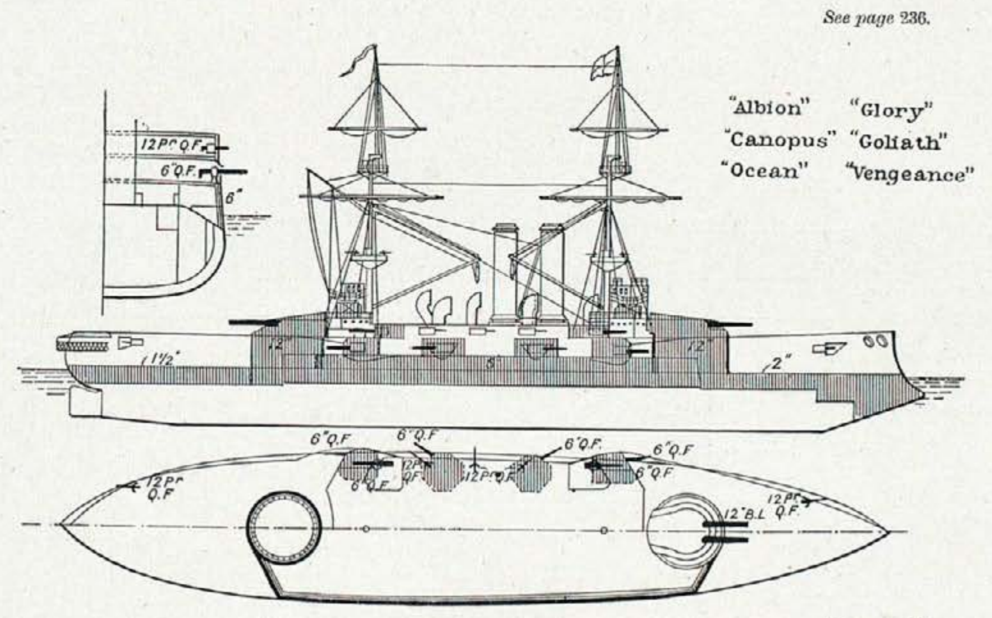
GREAT BRITAIN.

BATTLESHIPS.



× In These Ships 9" Armour Tapers to 2" at 30 ft From Bow, & They Have no Forward Bulkhead

See page 236.



See page 234.

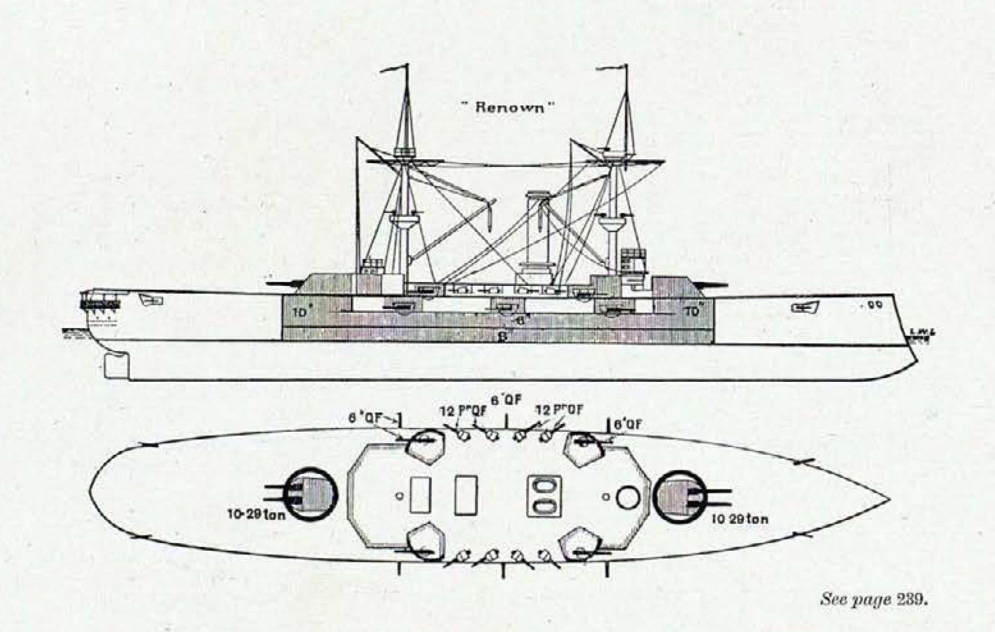
PLATE 3.

GREAT BRITAIN.

BATTLESHIPS.

Majestic. **Prince George.** **Illustrious.**
Magnificent. **Victorious.** **Cæsar.**
Hannibal. **Mars.** **Jupiter.**

See page 238



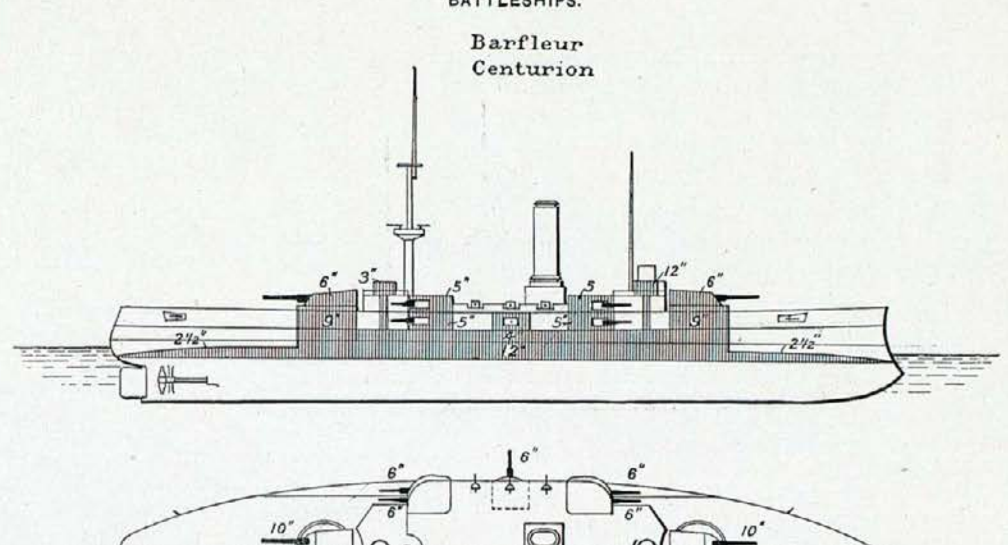
See page 239.

PLATE 4.

GREAT BRITAIN.

BATTLESHIPS.

Barfleur
Centurion



See page 235.

Royal Sovereign.
Empress of India.
Ramillies.
Repulse.

Resolution.
Revenge.
Royal Oak.
***Hood.**

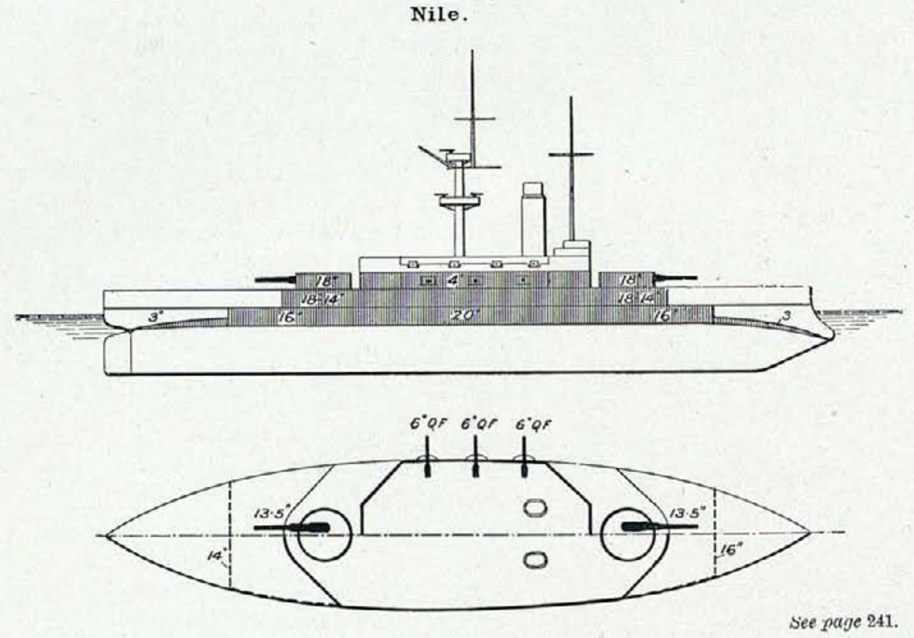
** The 13·5" guns are in turrets on the "Hood"*

See page 240.

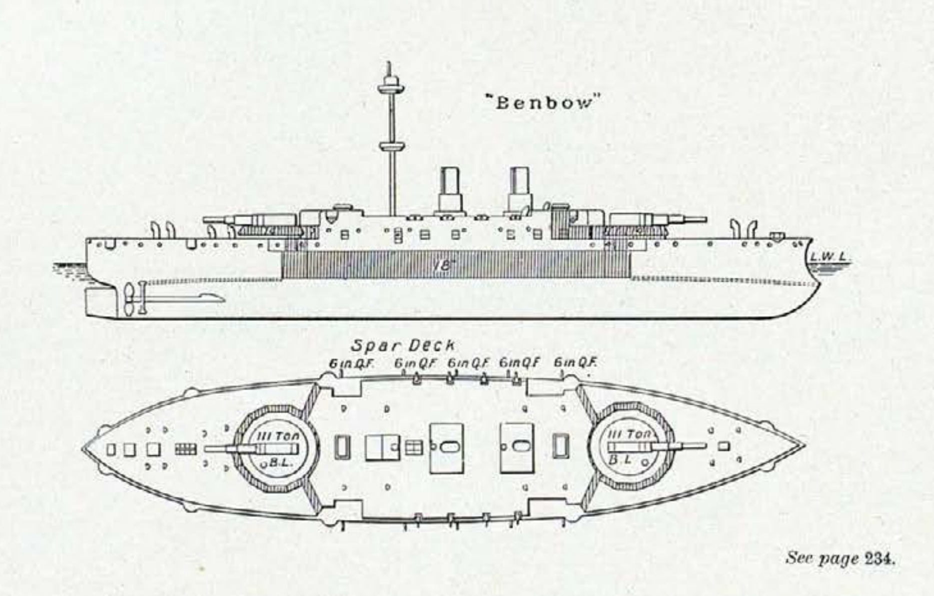
GREAT BRITAIN.

BATTLESHIPS.

Trafalgar.
Nile.



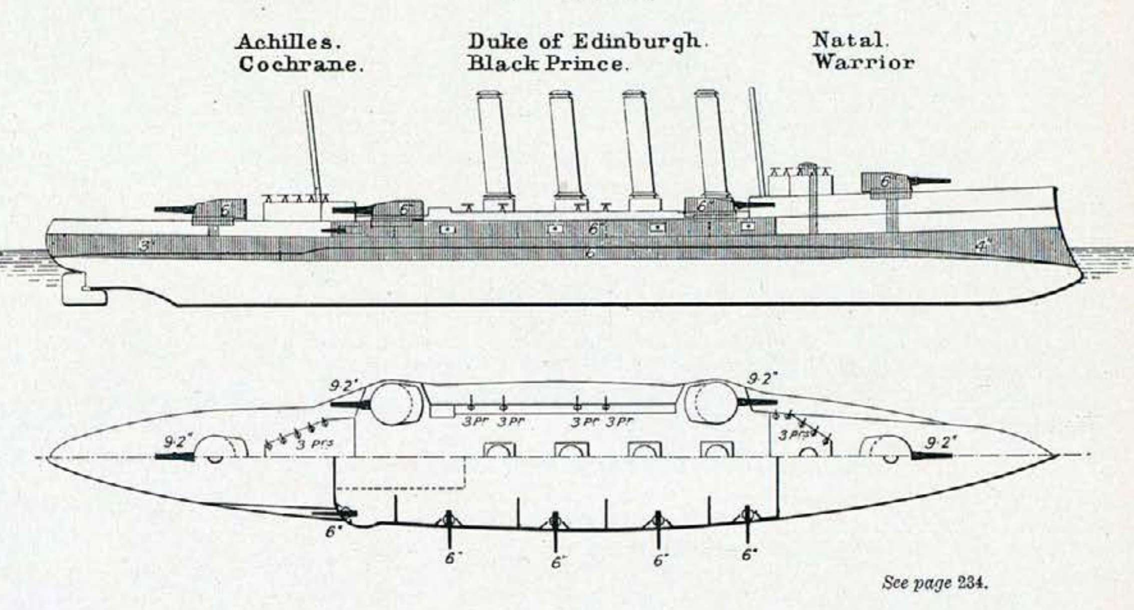
See page 241.



See page 234.

GREAT BRITAIN.

ARMOURED CRUISERS.



See page 234.

Devonshire. Roxburgh.
Hampshire. Antrim.
Argyll. Carnarvon.

See page 235.

PLATE 7.

GREAT BRITAIN.

ARMOURED CRUISERS.

Monmouth. Kent. Essex Bedford. Cornwall. Suffolk. Berwick. Cumberland. Donegal. Lancaster.

12 Pr 12 Pr 12 Pr 6" 6" 12 Pr 12 Pr 2-6" 2-6" 6" 6" 6" 4" 4" 4" 4" 2" 5 5

See page 238.

"Drake" "King Alfred" "Good Hope" "Leviathan"

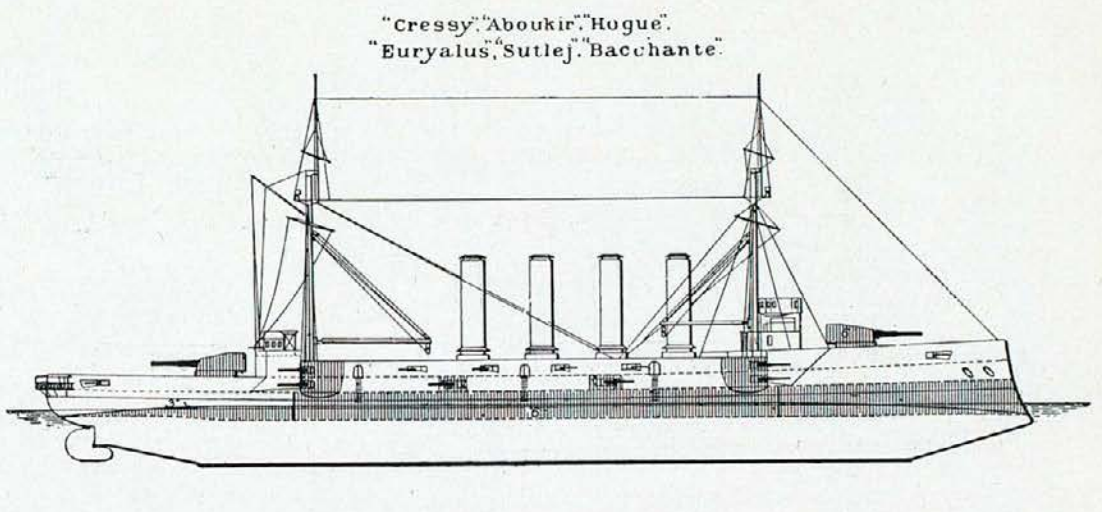
9·2" B.L. 12 Pr Q.F. 6"

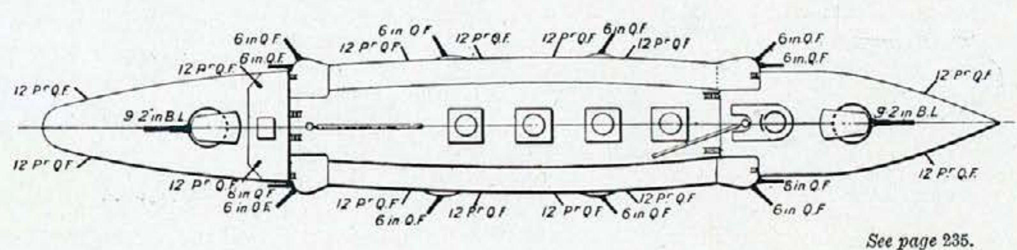
See page 236.

GREAT BRITAIN.

ARMOURED CRUISERS.

"Cressy". "Aboukir". "Hogue".
"Euryalus". "Sutlej". "Bacchante".

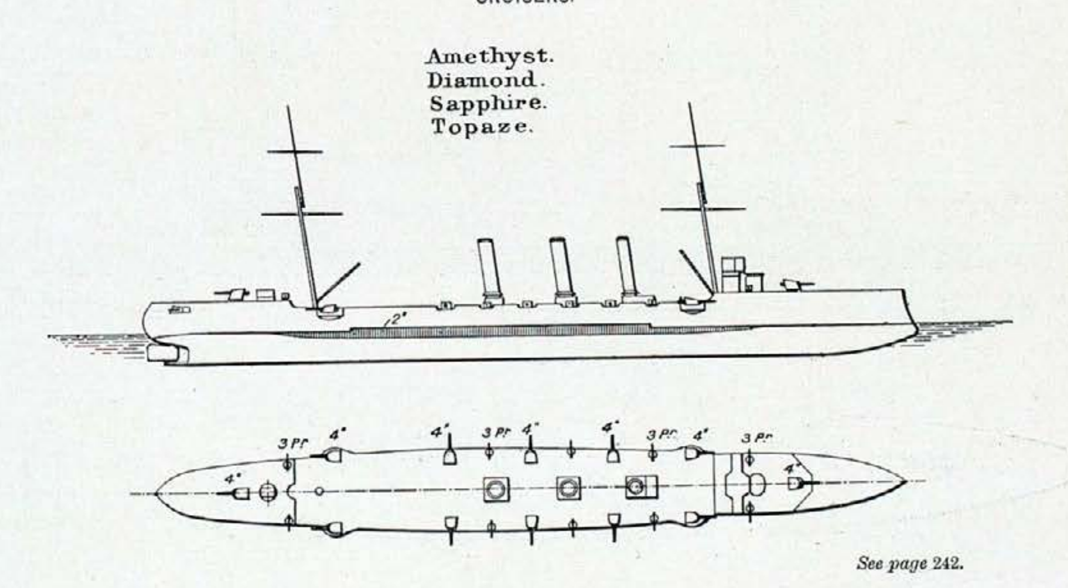




See page 235.

CRUISERS.

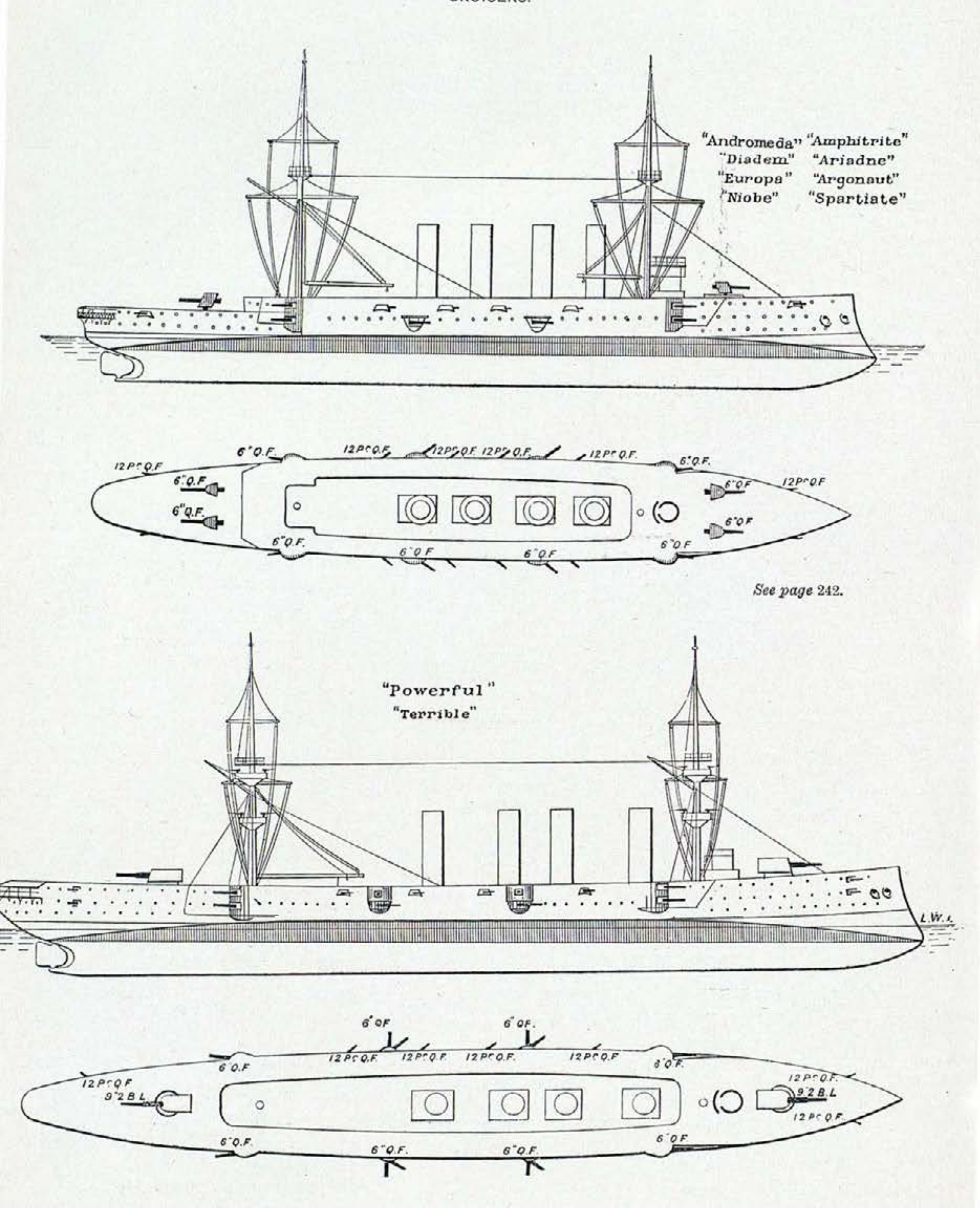
Amethyst.
Diamond.
Sapphire.
Topaze.



See page 242.

GREAT BRITAIN.

CRUISERS.



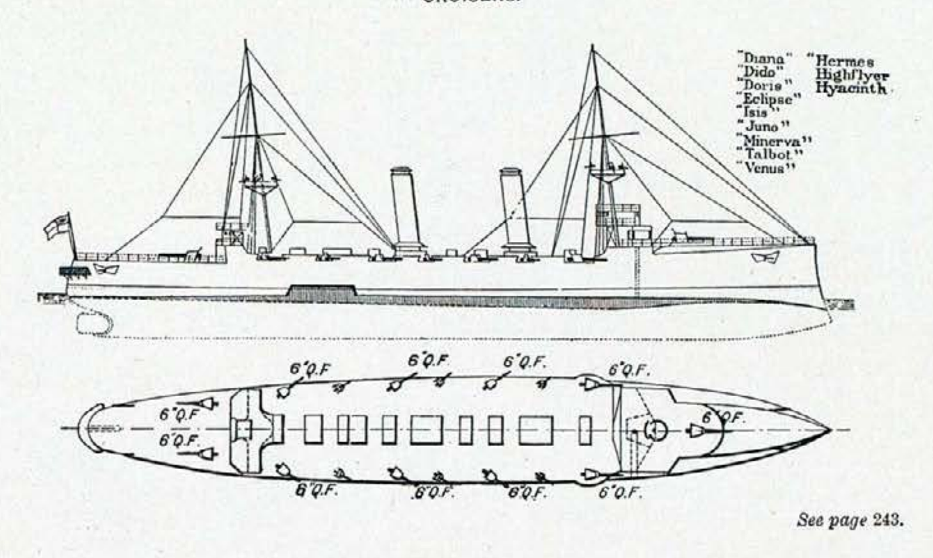
See page 242.

See page 247.

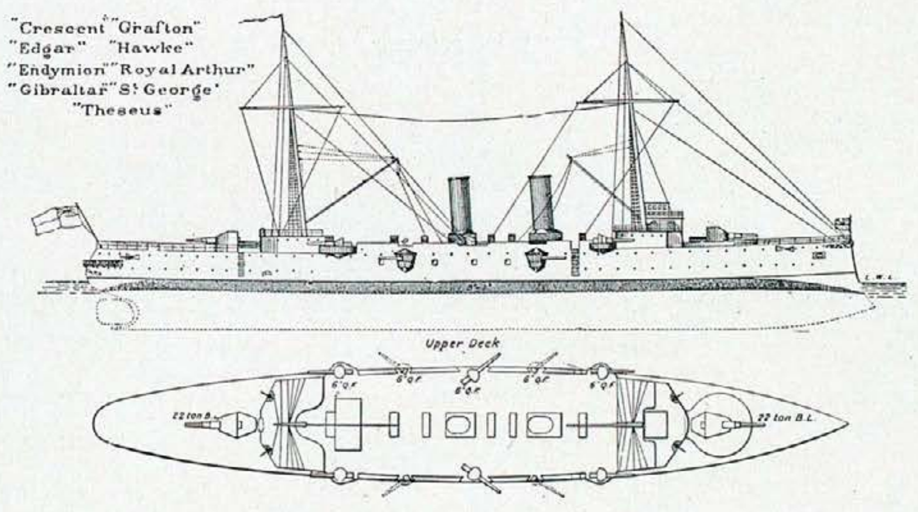
PLATE 10.

GREAT BRITAIN.

CRUISERS.



See page 243.



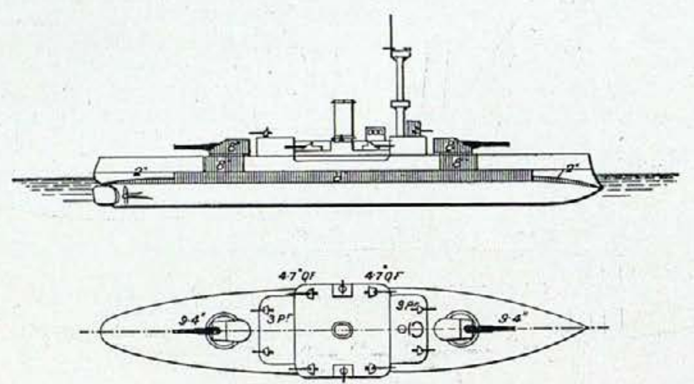
Note. *The Crescent and Royal Arthur have two 6 in guns forward in place of the 22 ton gun, and have a forecastle.*

See page 243.

ARGENTINA.

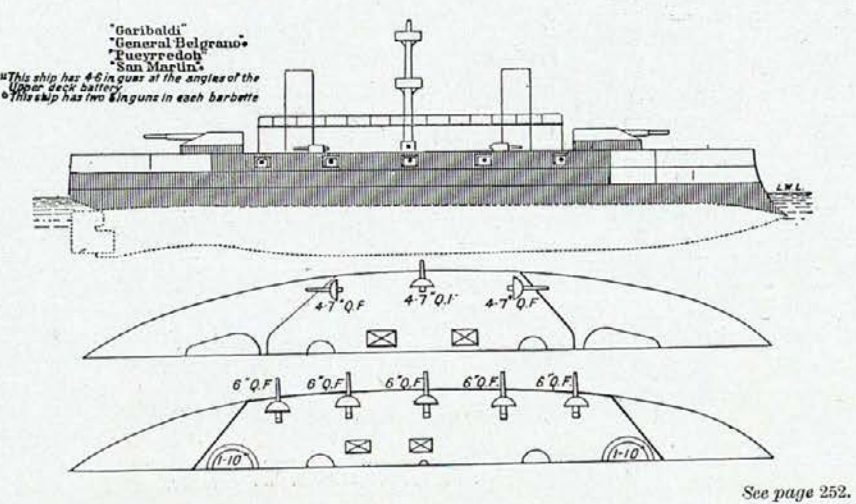
COAST DEFENCE SHIPS.

Libertad.
Independencia.



See page 252.

ARMOURED CRUISERS.

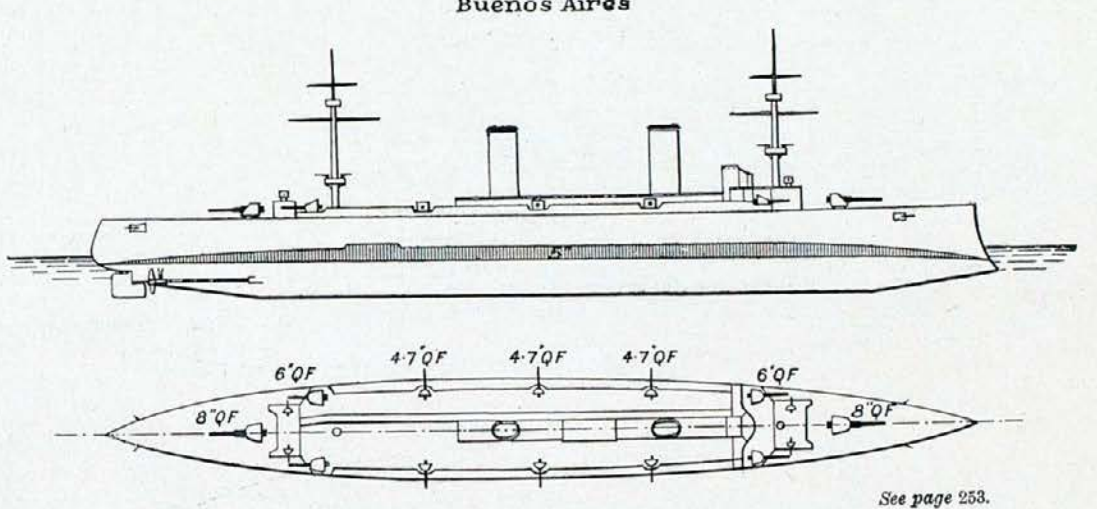


See page 252.

ARGENTINA.

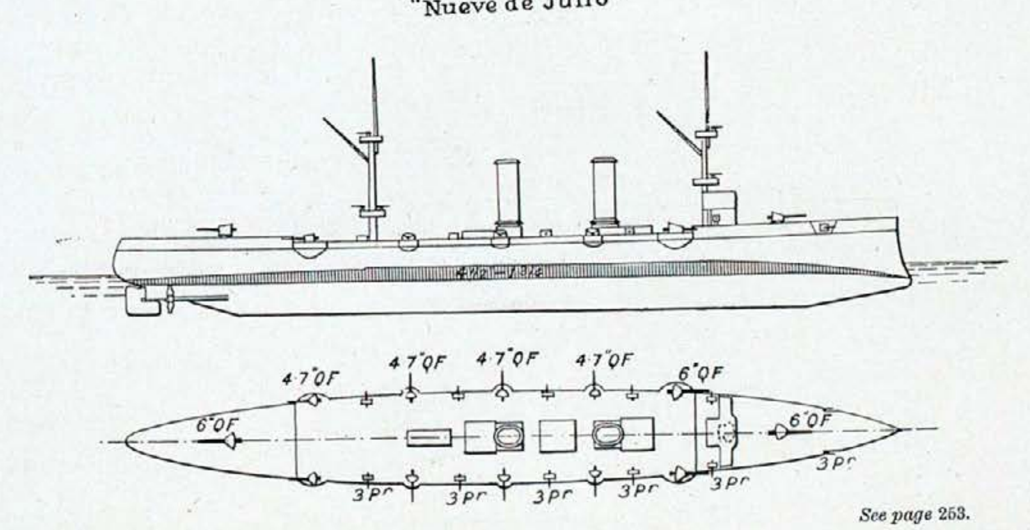
CRUISERS.

"Buenos Aires"



See page 253.

"Nueve de Julio"

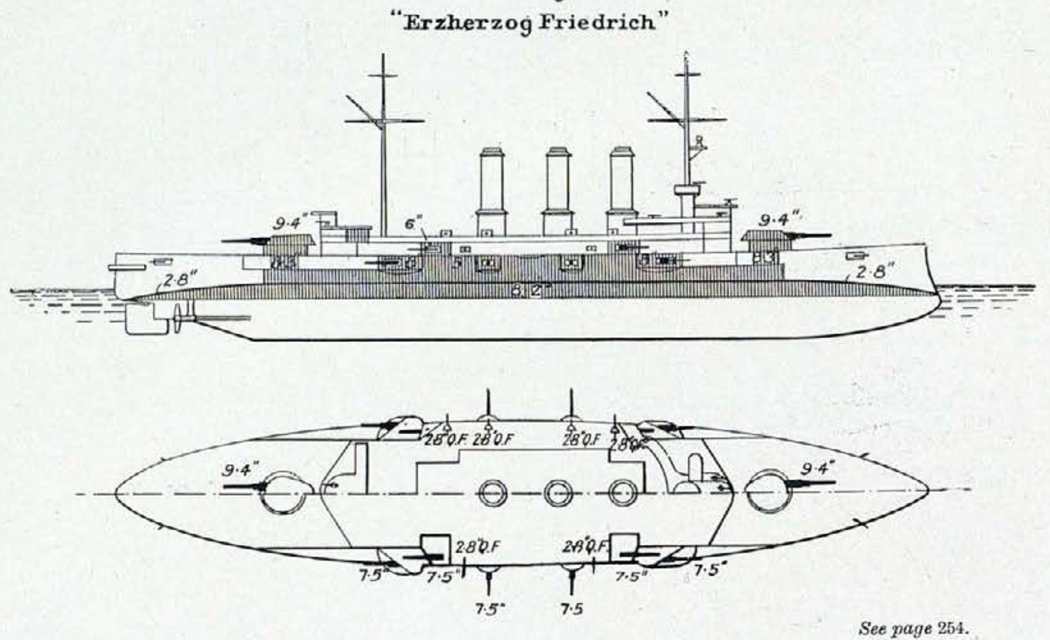


See page 253.

AUSTRIA.

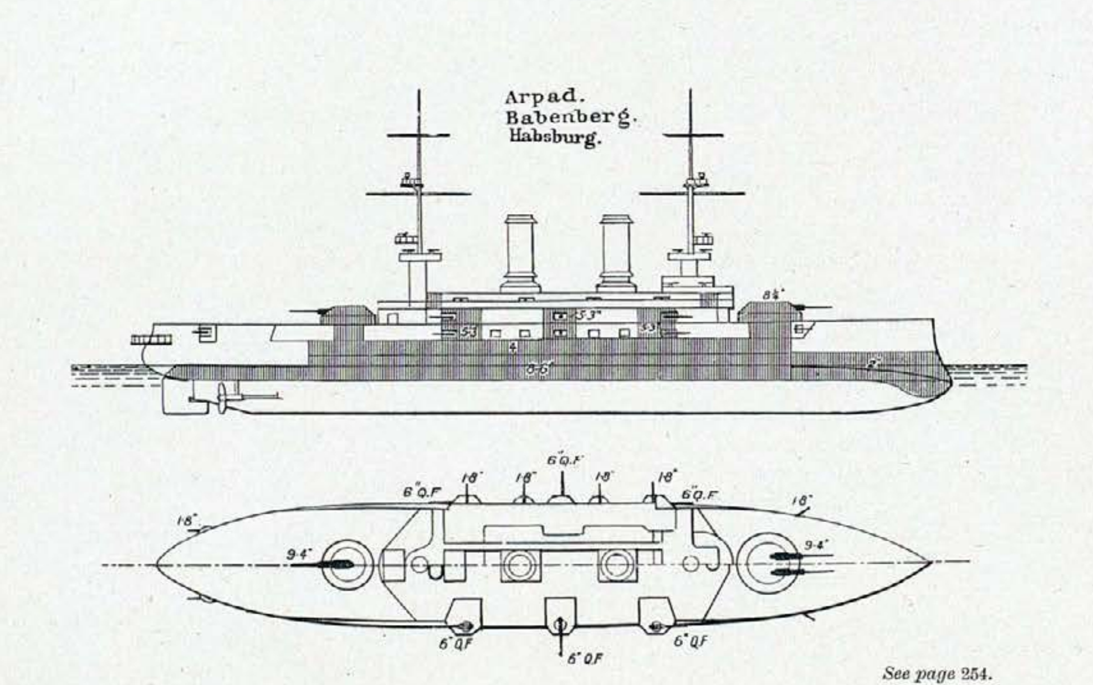
BATTLESHIPS.

Erzherzog Karl
"Erzherzog Friedrich"



See page 254.

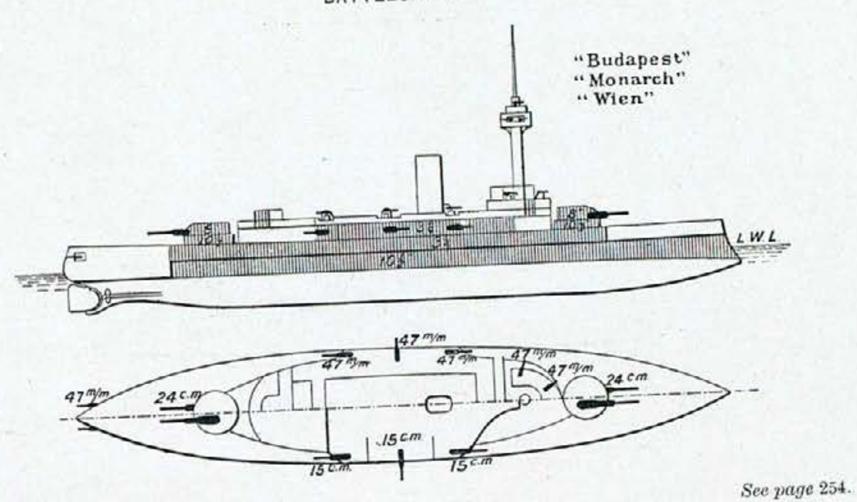
Arpad.
Babenberg.
Habsburg.



See page 254.

AUSTRIA.

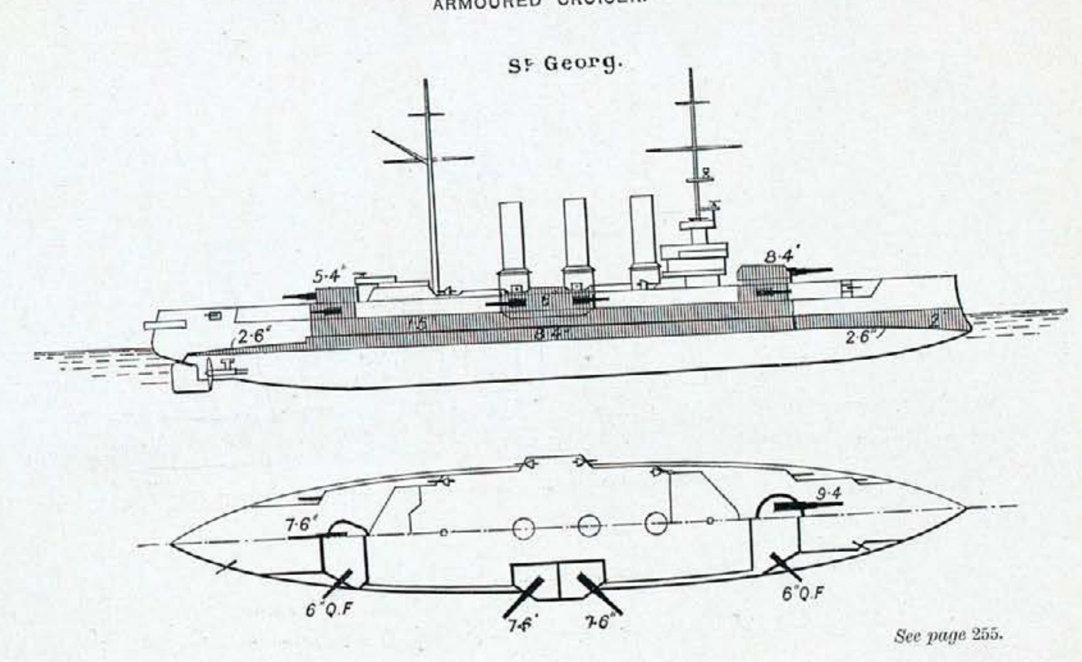
BATTLESHIPS.



See page 254.

ARMOURED CRUISER.

St. Georg.

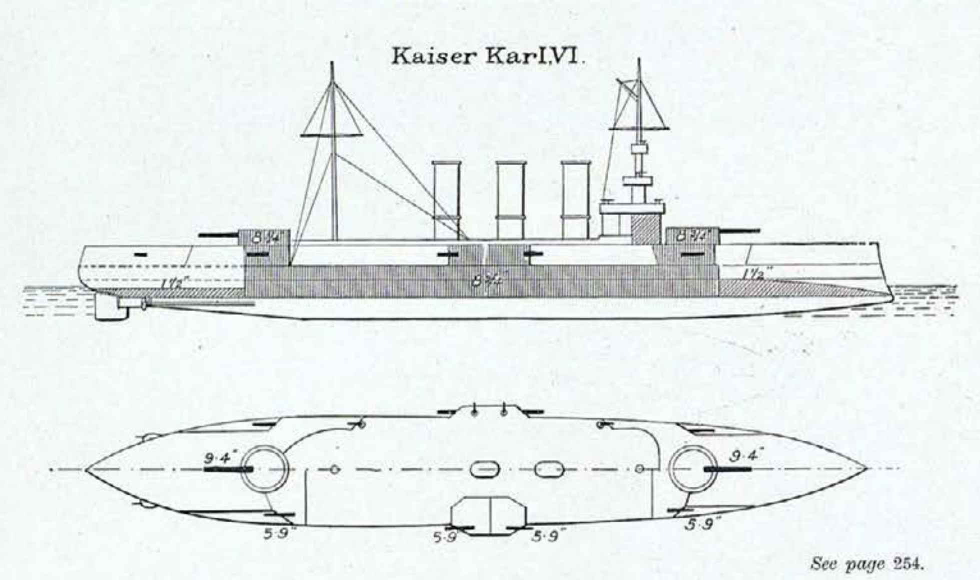


See page 255.

AUSTRIA.

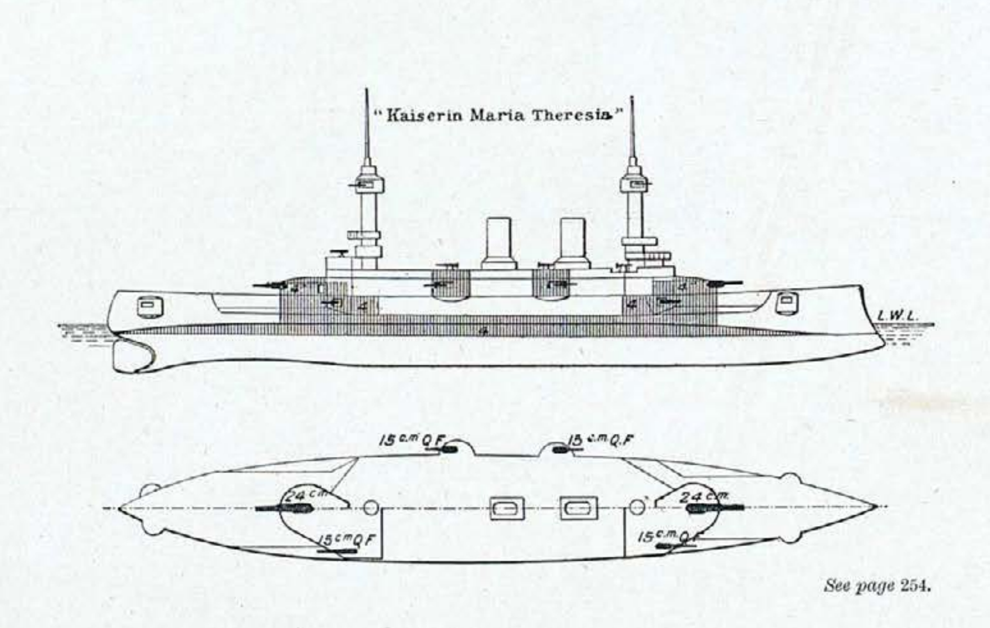
ARMOURED CRUISERS.

Kaiser Karl VI.



See page 254.

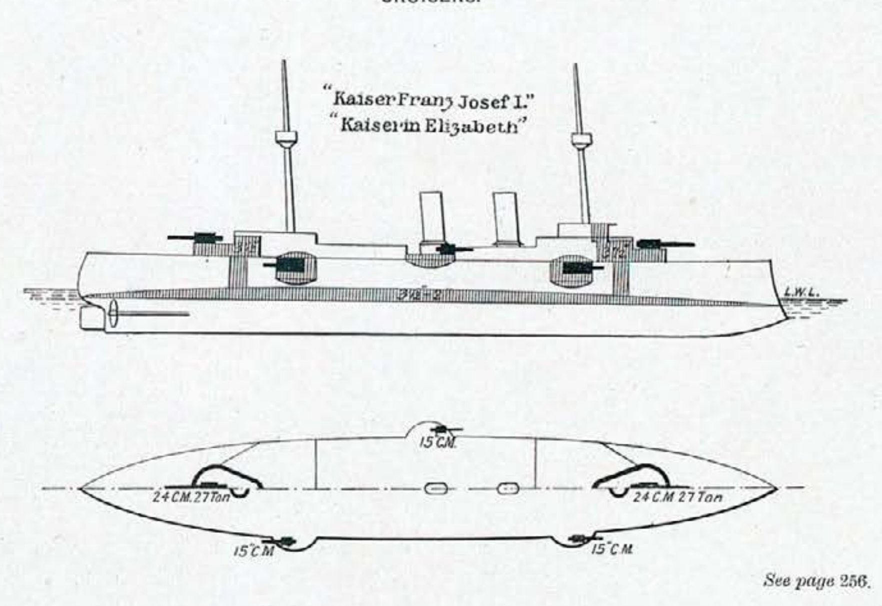
"Kaiserin Maria Theresia"



See page 254.

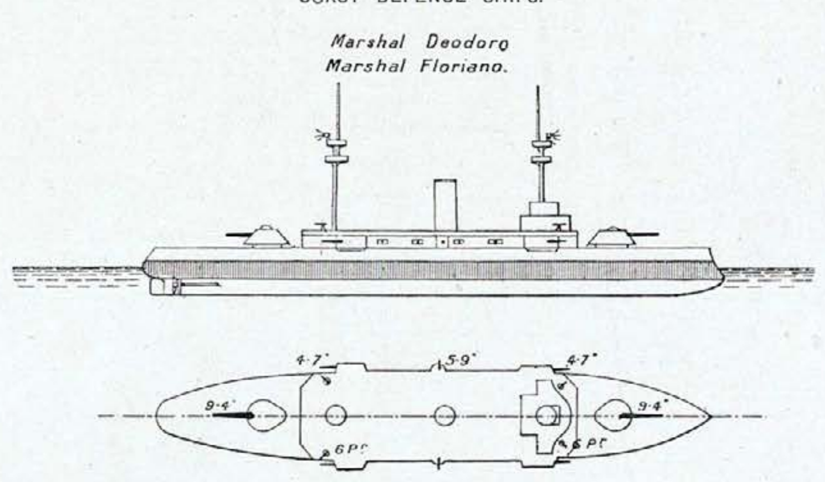
AUSTRIA.

CRUISERS.



See page 256.

BRAZIL.

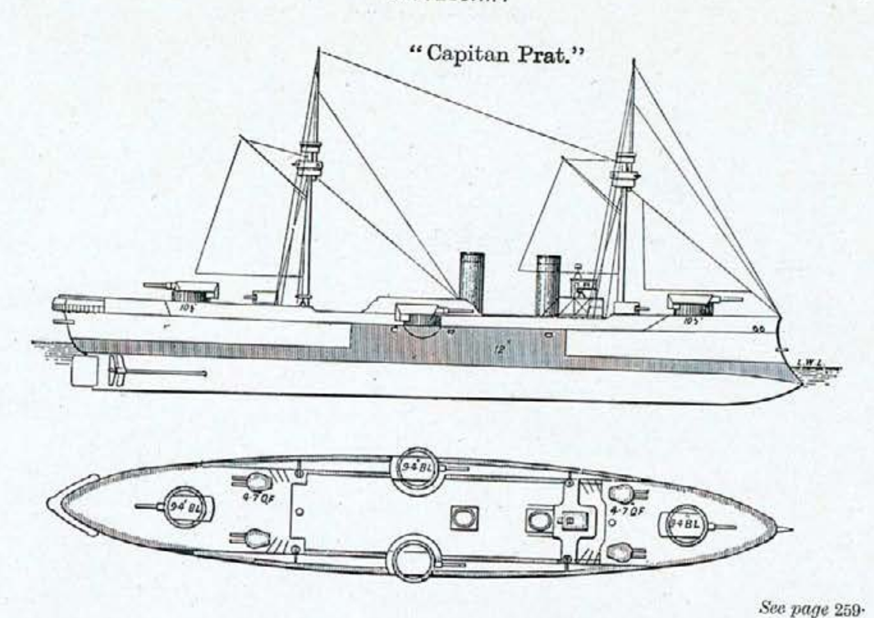


See page 257.

CHILI.

BATTLESHIP.

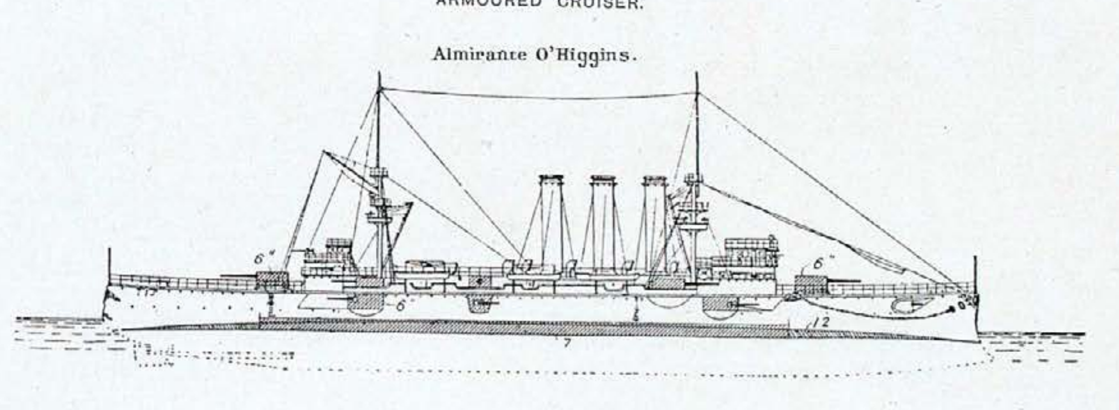
"Capitan Prat."

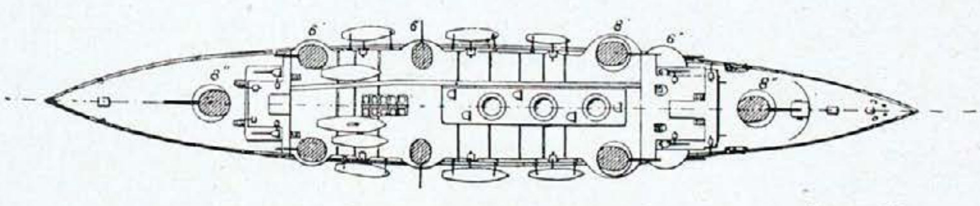


See page 259.

ARMOURED CRUISER.

Almirante O'Higgins.



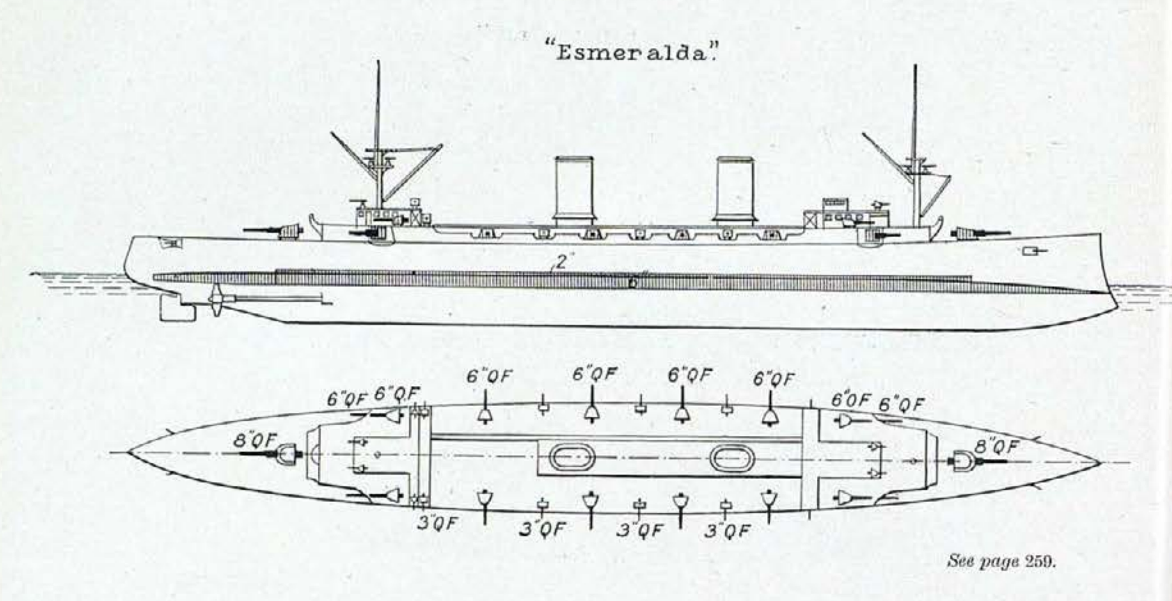


See page 259.

CHILI.

ARMOURED CRUISER.

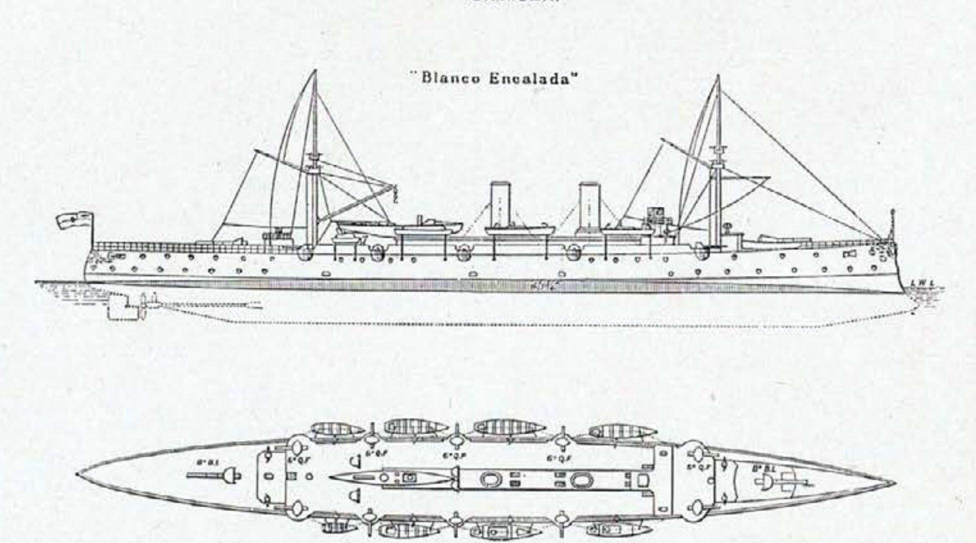
"Esmeralda".



See page 259.

CRUISER.

"Blanco Encalada"



See page 259.

DENMARK.

COAST DEFENCE SHIPS.

Herluf Trolle.
Olfert Fischer.
Peder Schram.

See page 261.

FRANCE.

BATTLESHIPS.

Démocratie
Justice
Liberté
Vérite

See page 264.

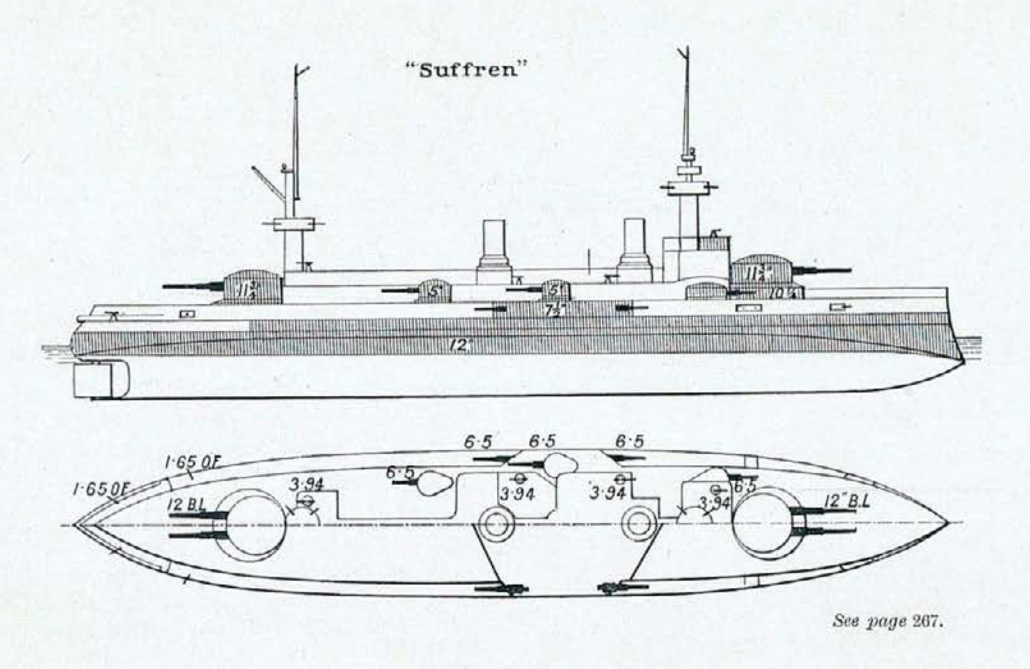
"République."

See page 267.

FRANCE.

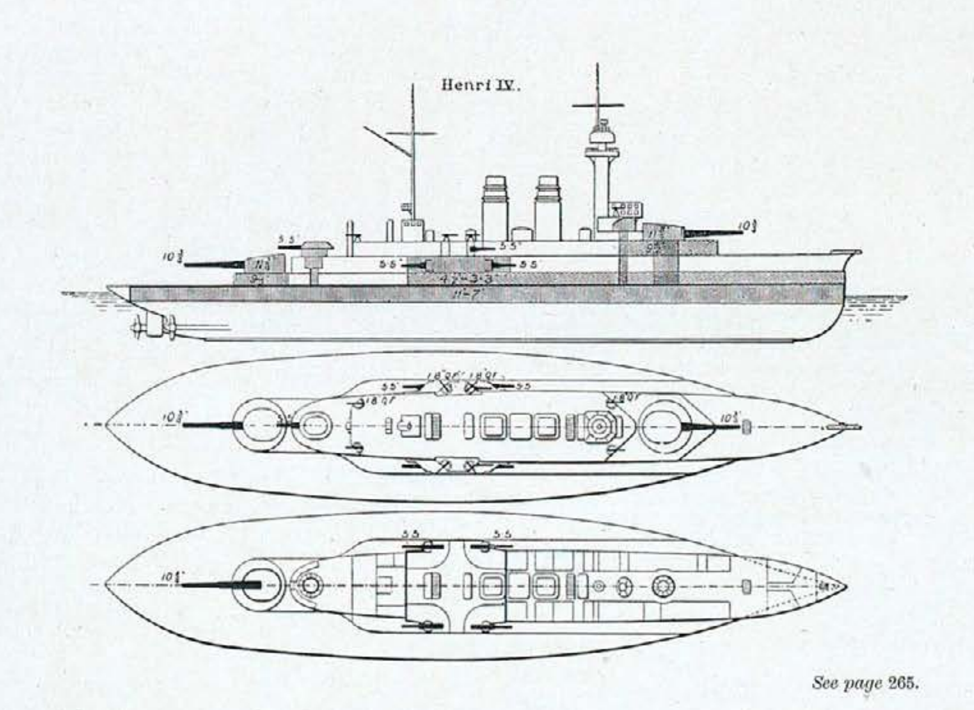
BATTLESHIPS.

"Suffren"



See page 267.

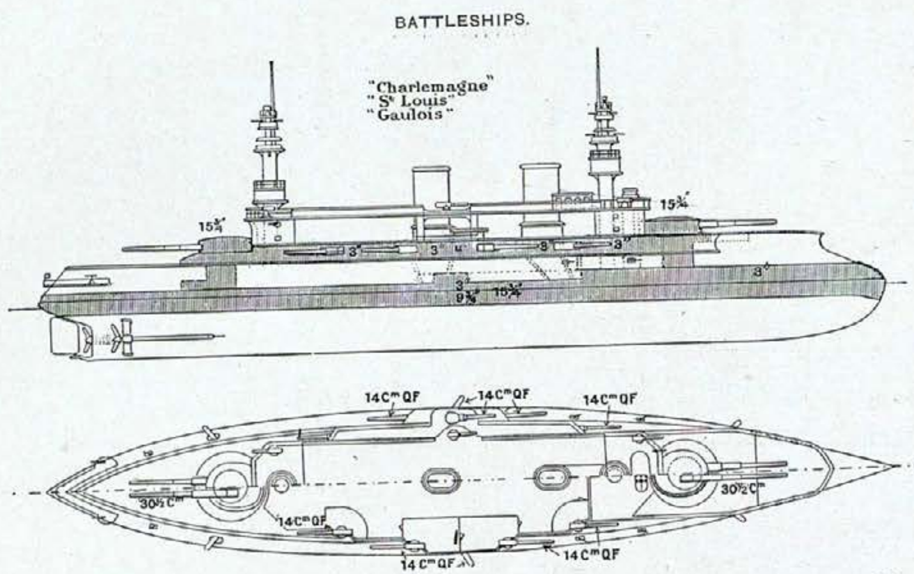
Henri IV.



See page 265.

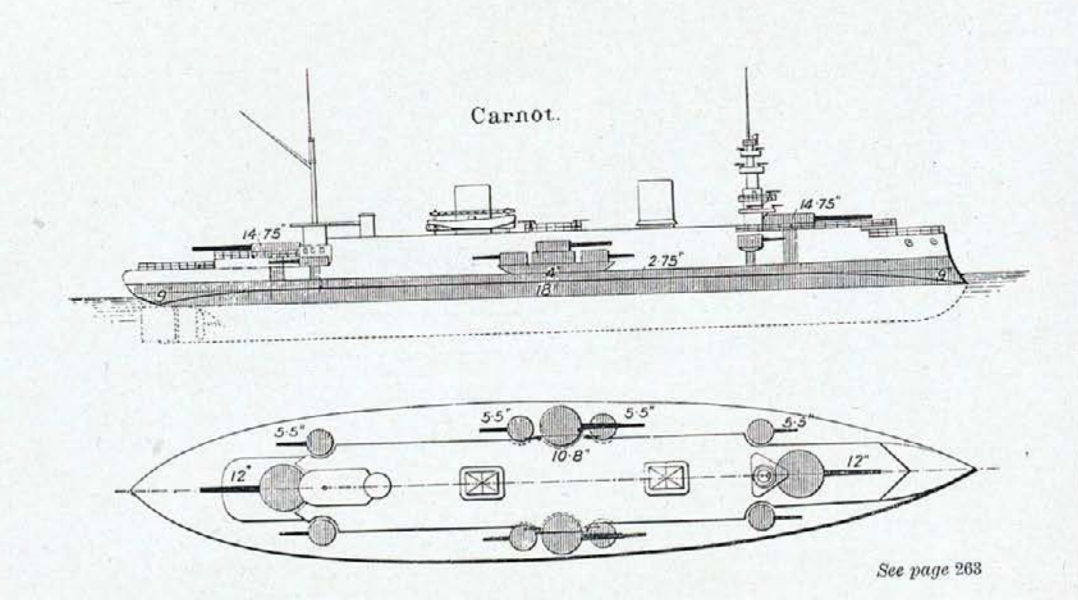
FRANCE.

BATTLESHIPS.



See page 263.

Carnot.

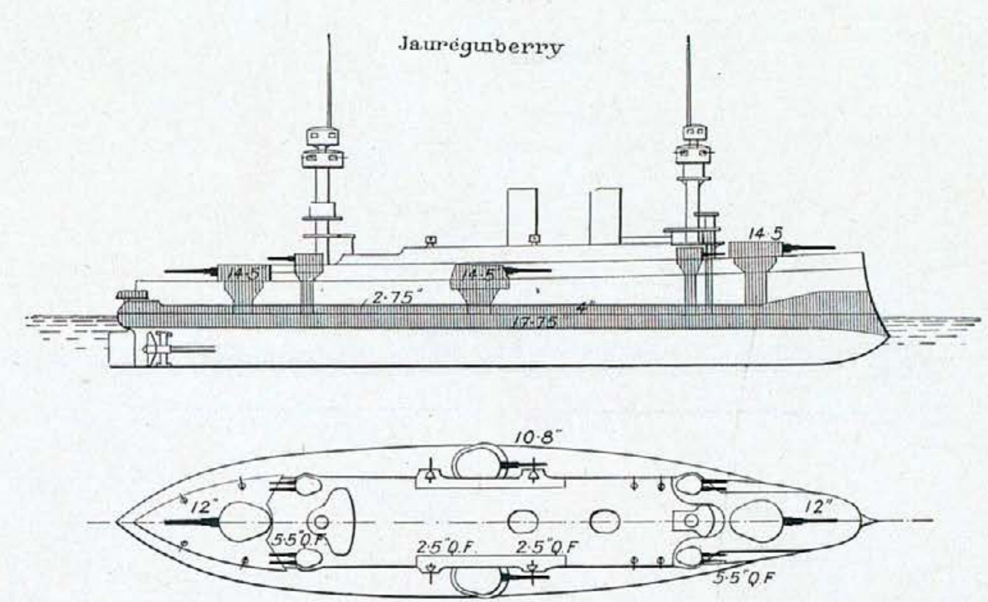


See page 263

FRANCE.

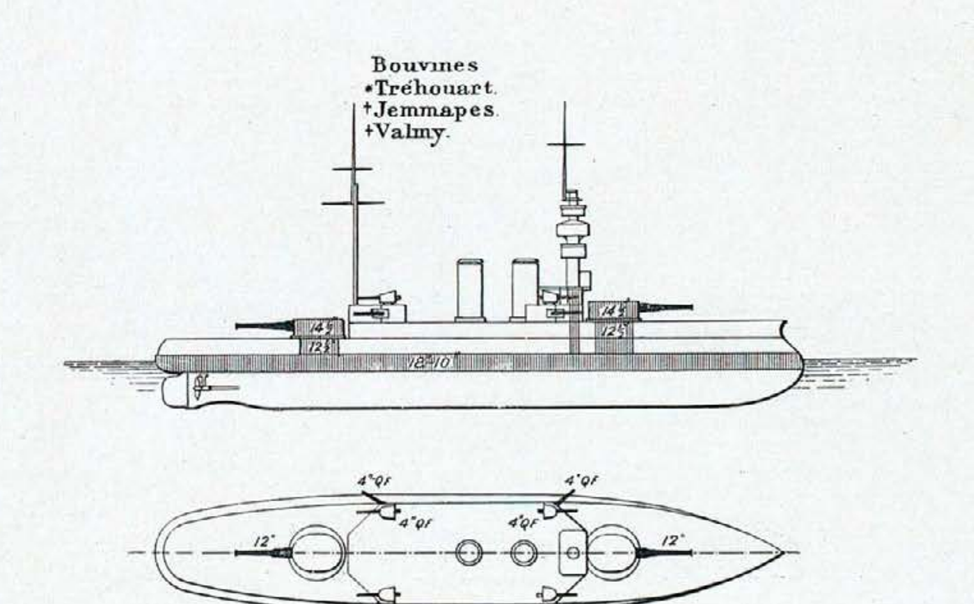
BATTLESHIPS.

Jauréguiberry



See page 265.

Bouvines
*Tréhouart.
†Jemmapes.
†Valmy.



* The "Tréhouart" has but one funnel.

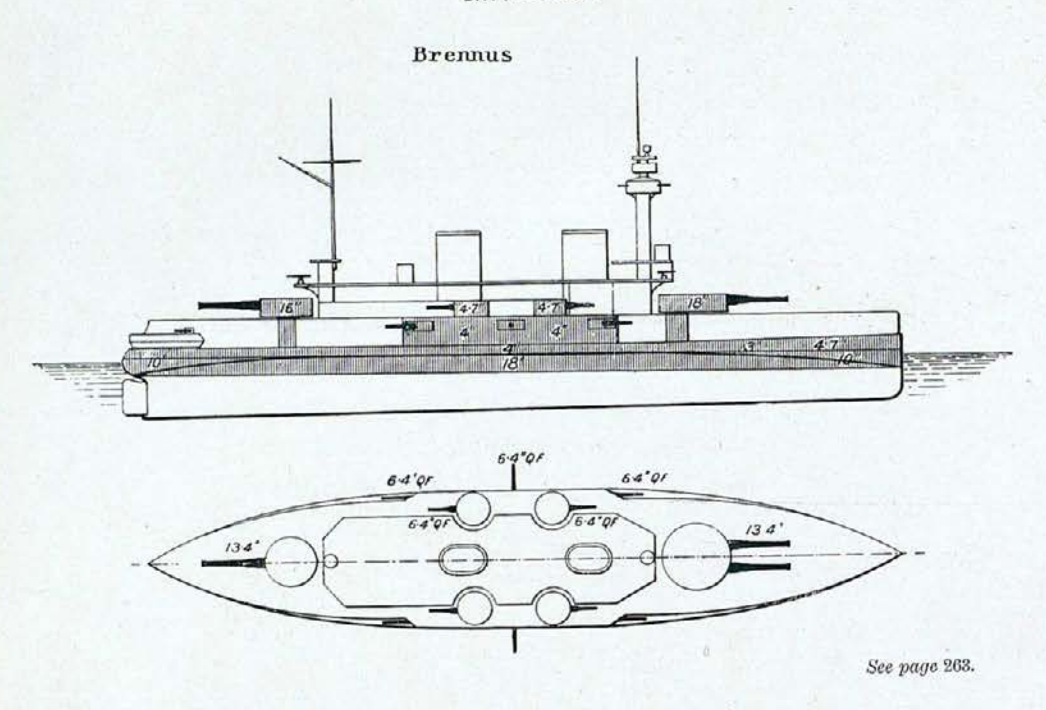
† These ships have 13·4" guns in the turret and only 4·4" guns. The forward 13·4" gun is mounted on the same deck as the after one.

See page 263.

FRANCE.

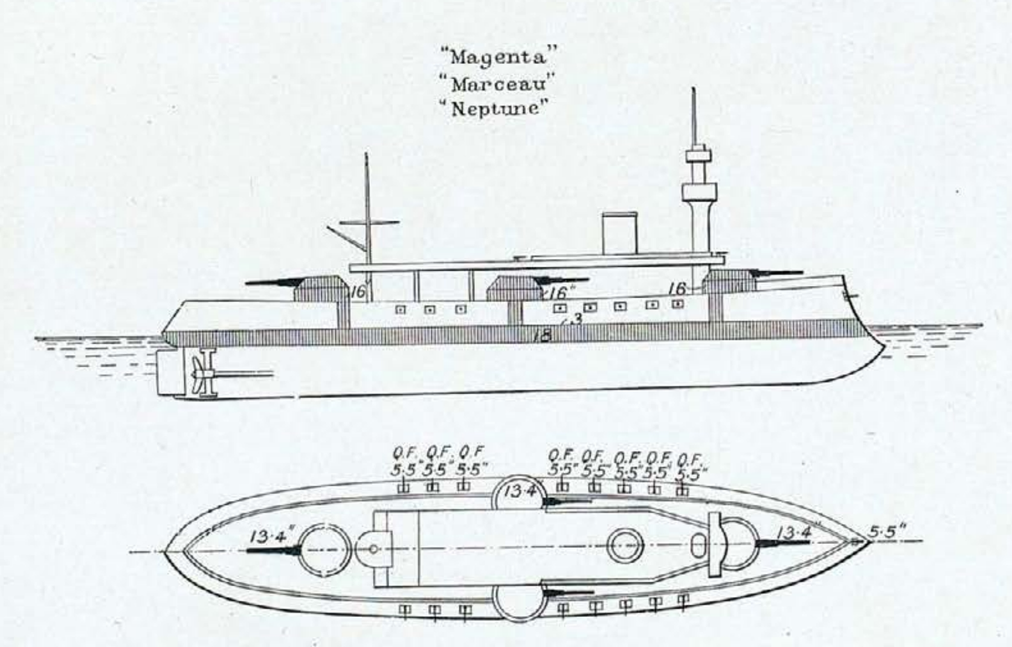
BATTLESHIPS.

Brennus



See page 263.

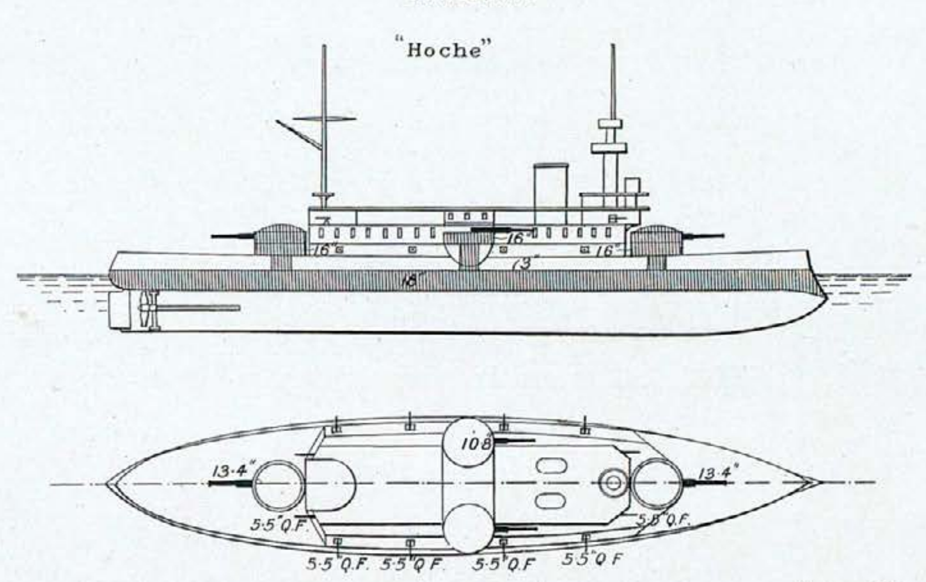
"Magenta"
"Marceau"
"Neptune"



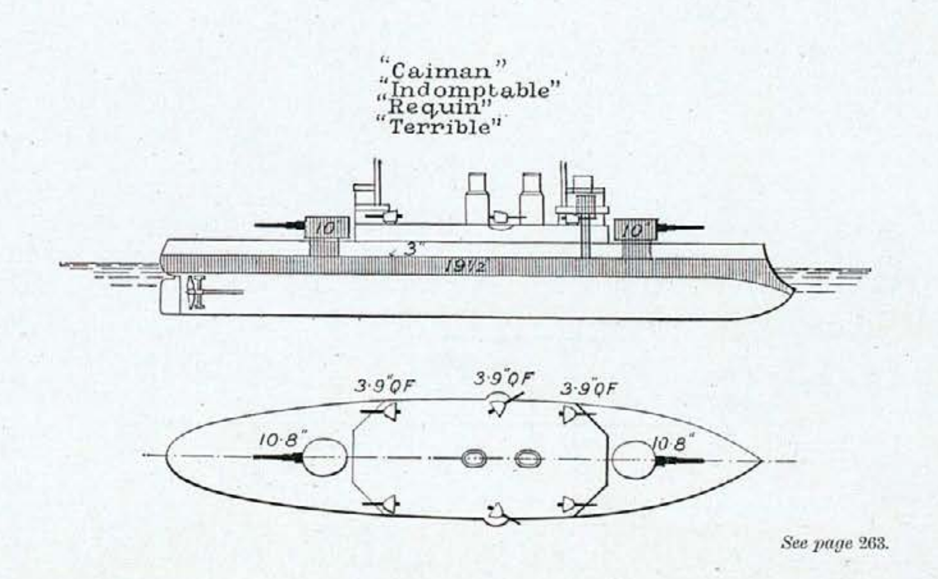
See page 266.

FRANCE.

BATTLESHIPS.



See page 265.



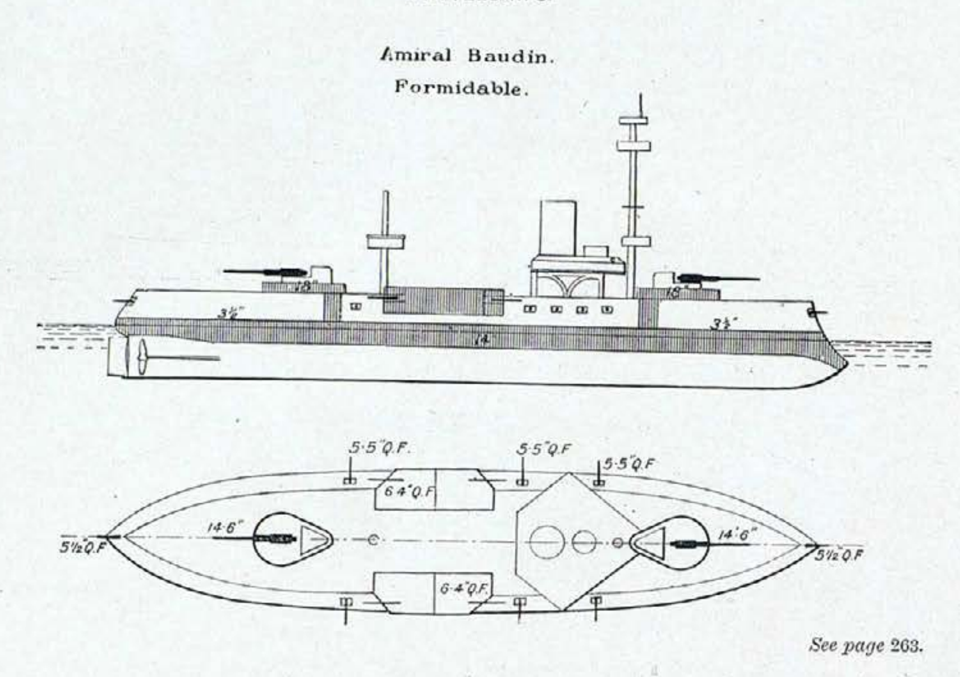
See page 263.

FRANCE.

BATTLESHIPS.

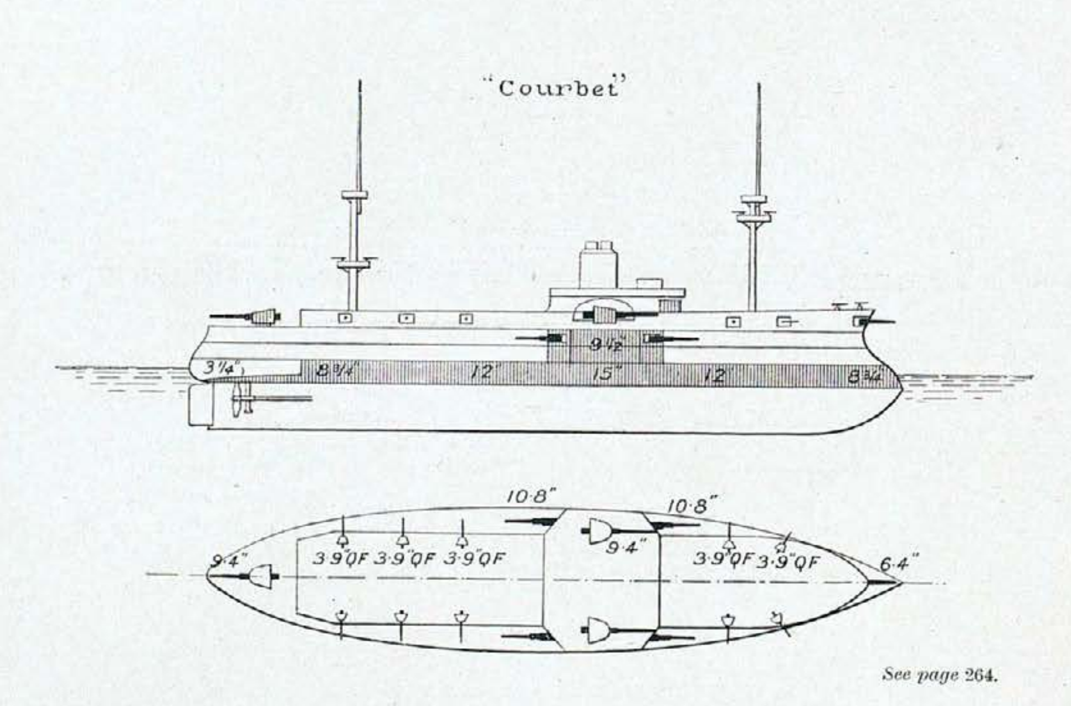
Amiral Baudin.

Formidable.



See page 263.

"Courbet"

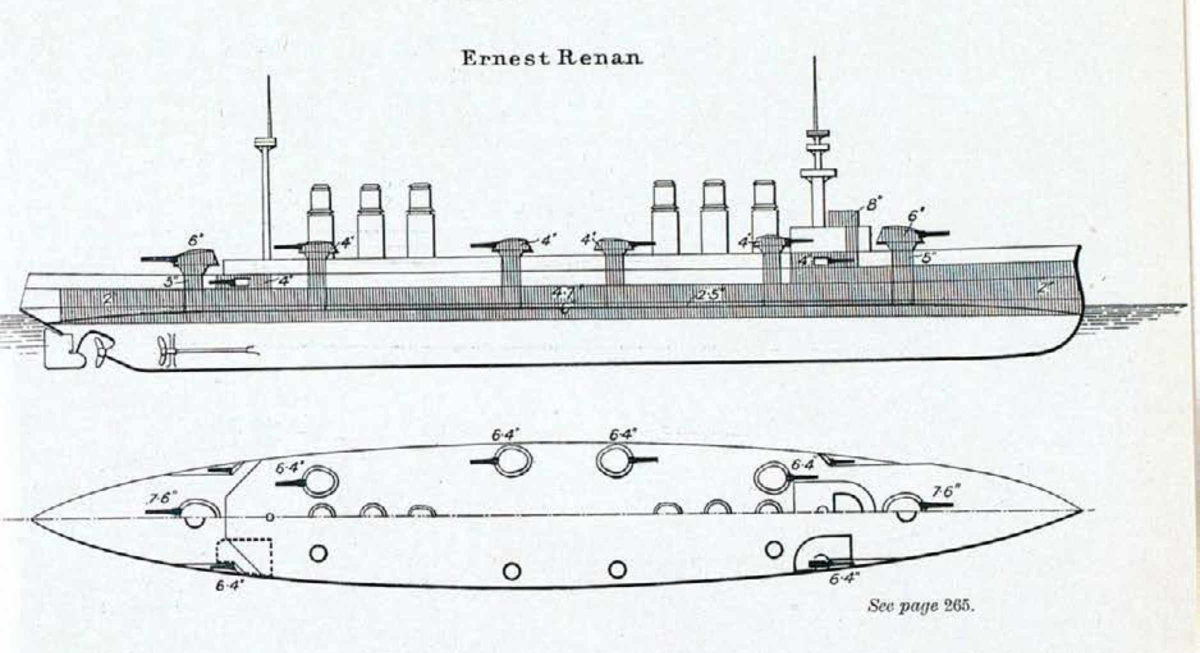


See page 264.

FRANCE.

ARMOURED CRUISERS.

Ernest Renan



See page 265.

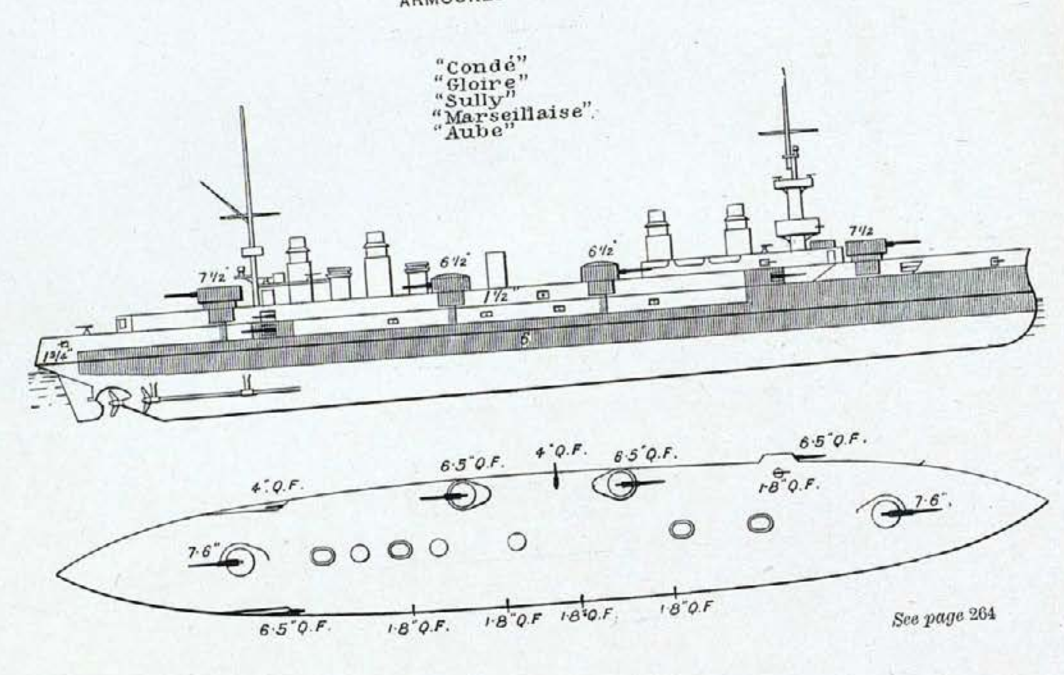
Jules Ferry
Léon Gambetta
Victor Hugo

5"
5"
5"
5"
5"
4"
5"
2½"
6"
3"
6·4" Q.F.
6·4" Q.F.
6·4" Q.F
6·4" Q.F
6·4 Q.F
7·6"
7·6"

See page 265.

FRANCE.

ARMOURED CRUISERS.



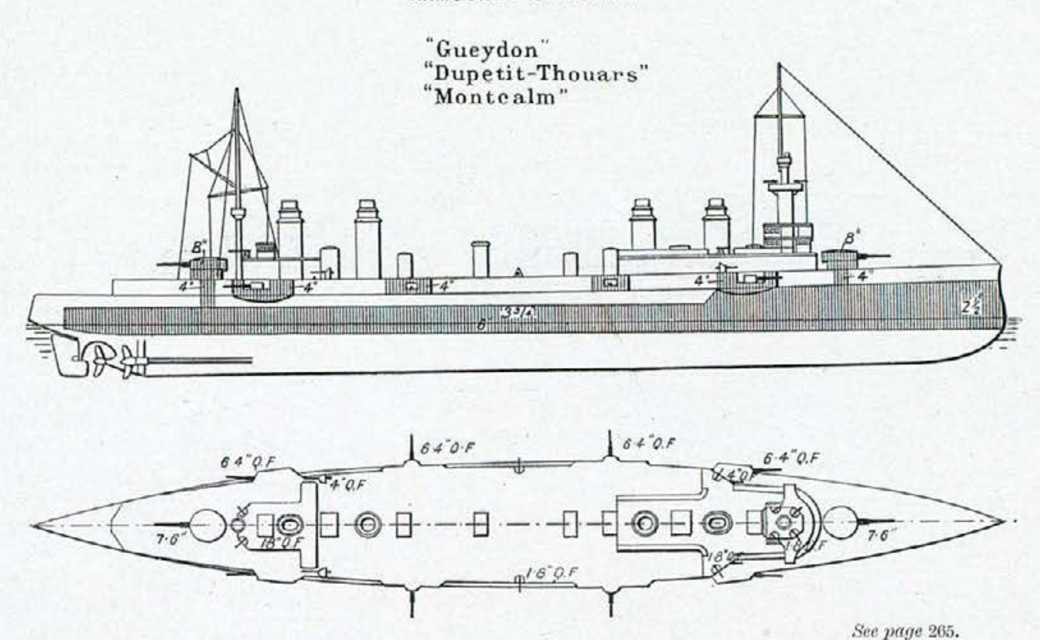
Desaix.
Kléber.
Dupleix.

See page 264.

FRANCE

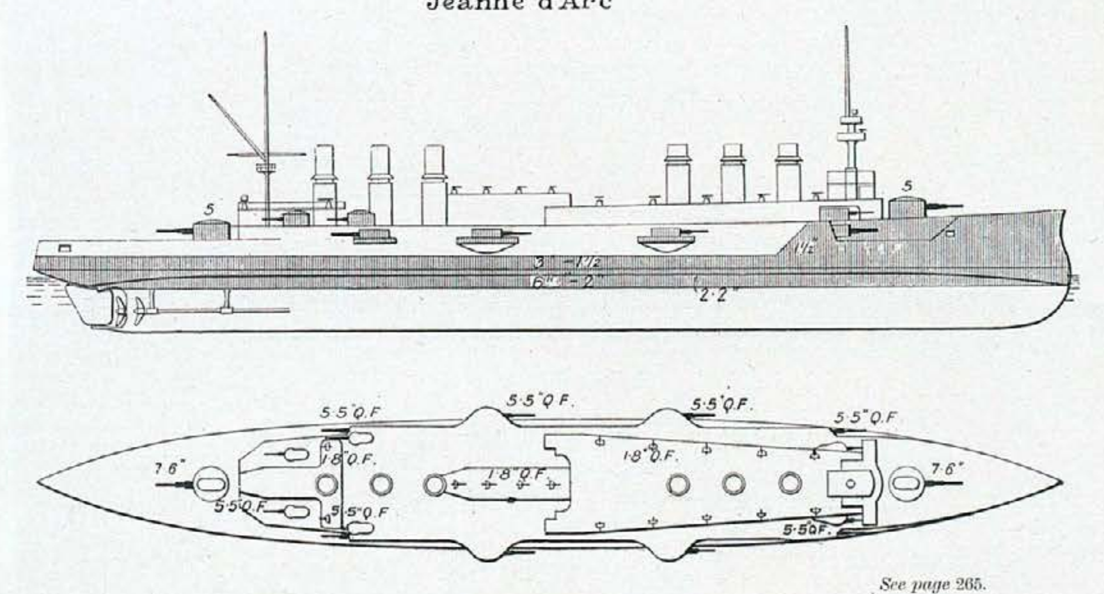
ARMOURED CRUISERS.

"Gueydon"
"Dupetit-Thouars"
"Montcalm"



See page 265.

"Jeanne d'Arc"

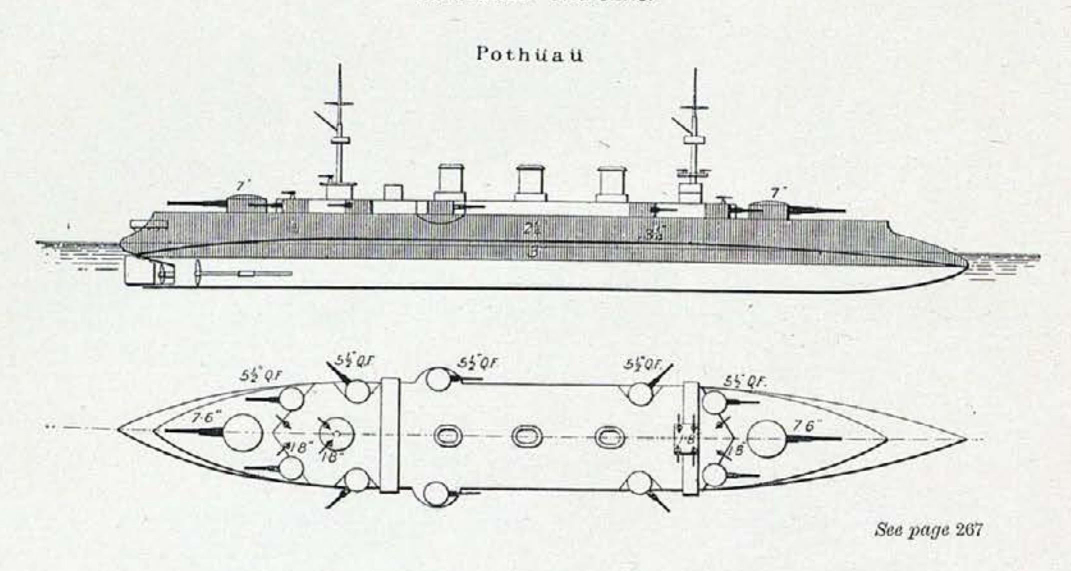


See page 265.

FRANCE.

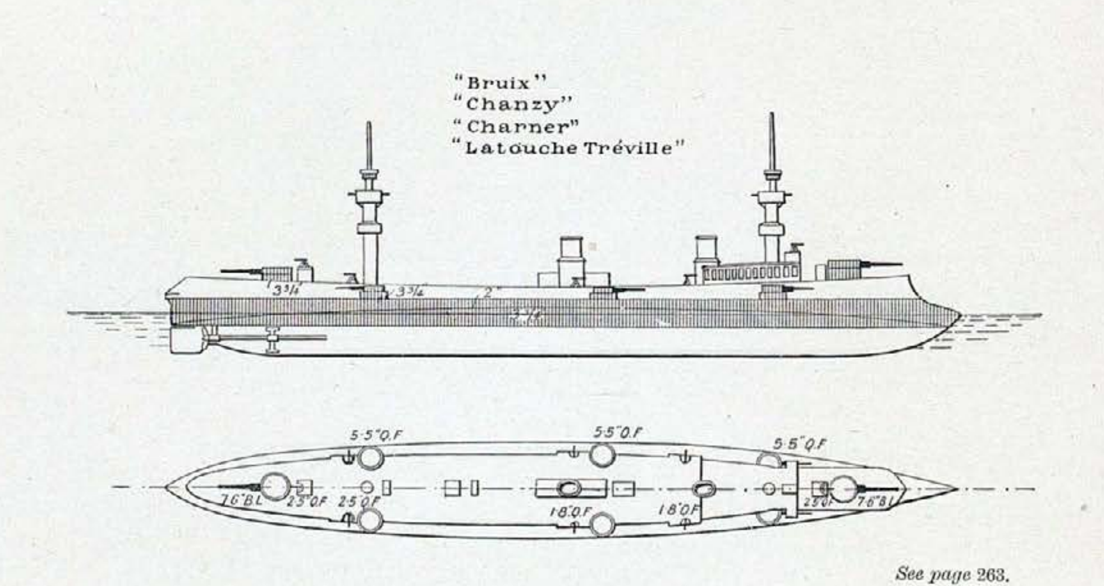
ARMOURED CRUISERS.

Pothuau



See page 267

"Bruix"
"Chanzy"
"Charner"
"Latouche Tréville"

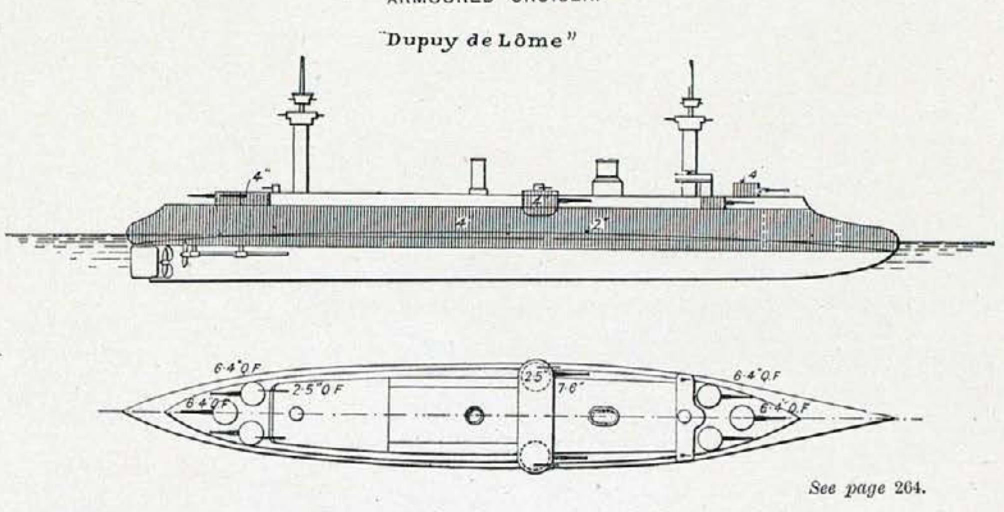


See page 263.

FRANCE.

ARMOURED CRUISER.

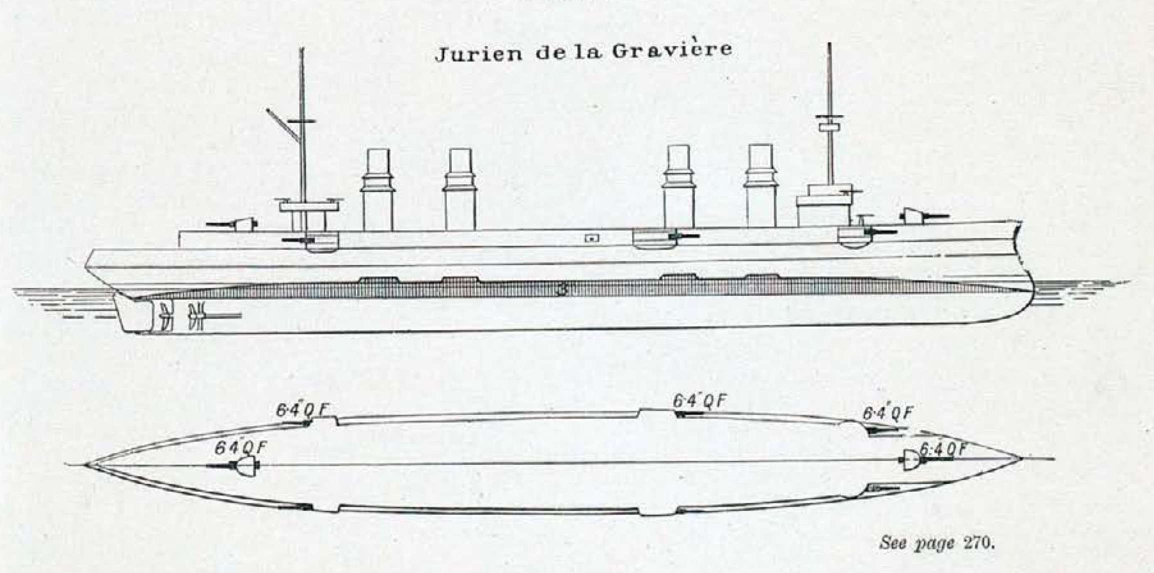
"Dupuy de Lôme"



See page 264.

CRUISER.

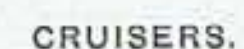
Jurien de la Gravière

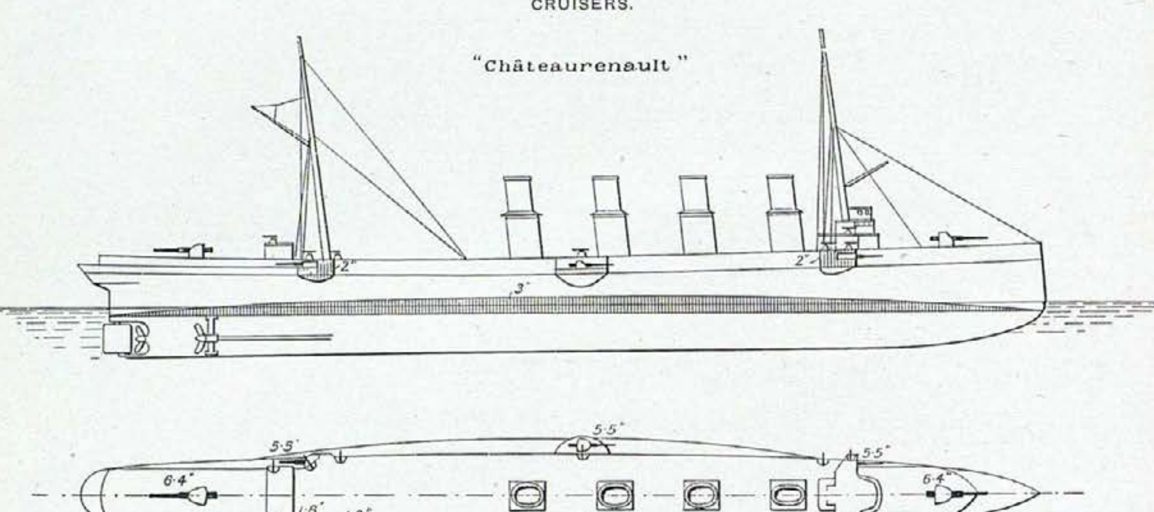


See page 270.

PLATE 33.

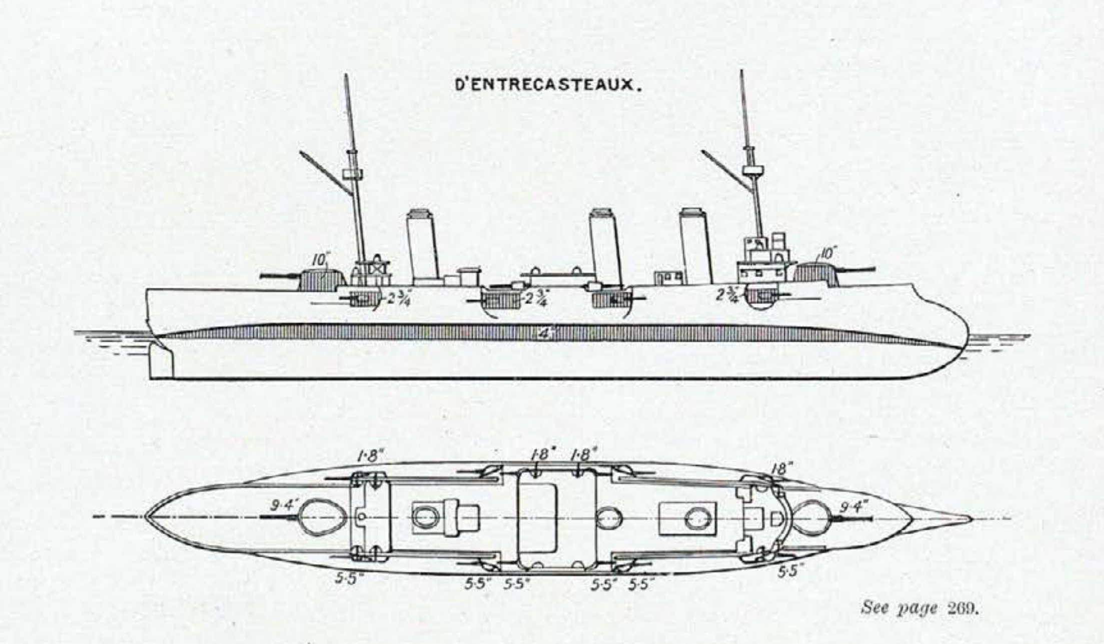
FRANCE.





See page 268.

D'ENTRECASTEAUX.

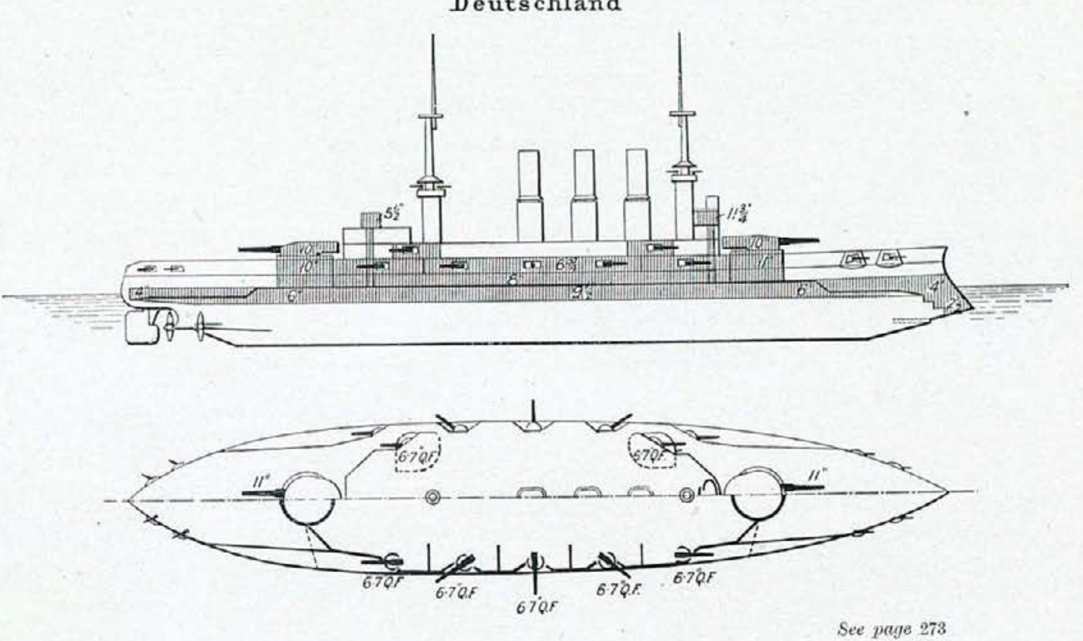


See page 269.

GERMANY.

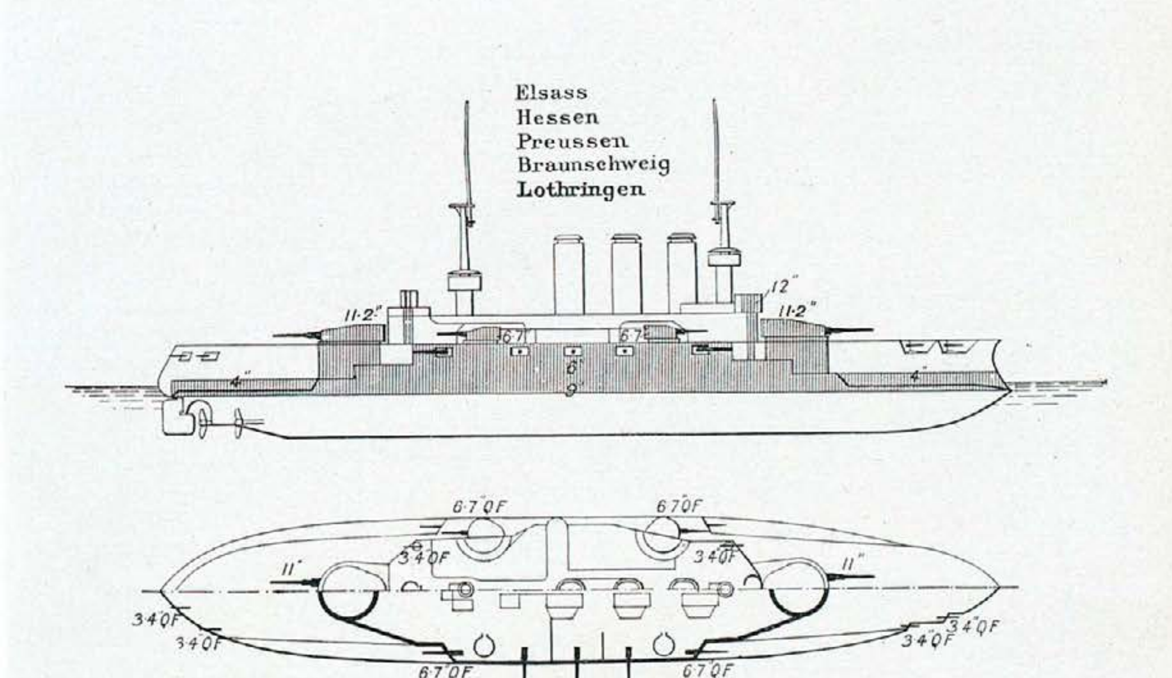
BATTLESHIPS.

Deutschland



See page 273

Elsass
Hessen
Preussen
Braunschweig
Lothringen

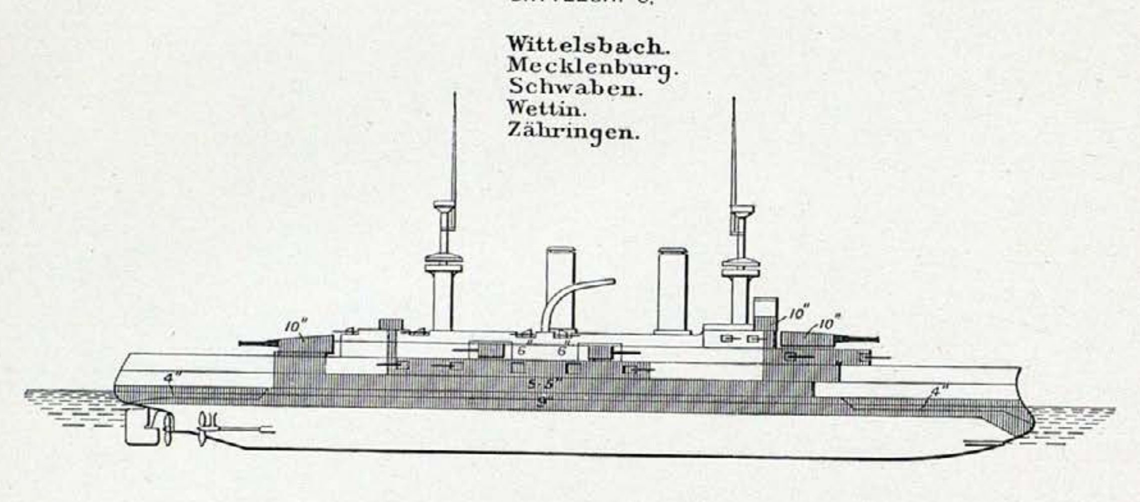


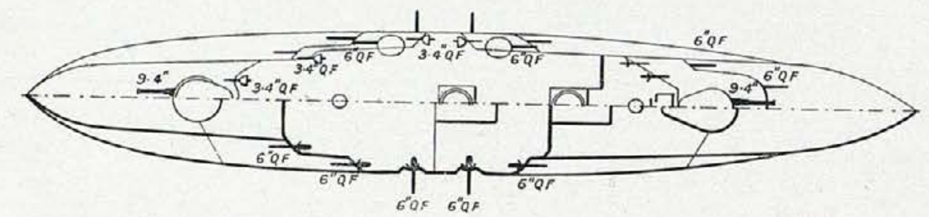
See page 273.

GERMANY.

BATTLESHI S.

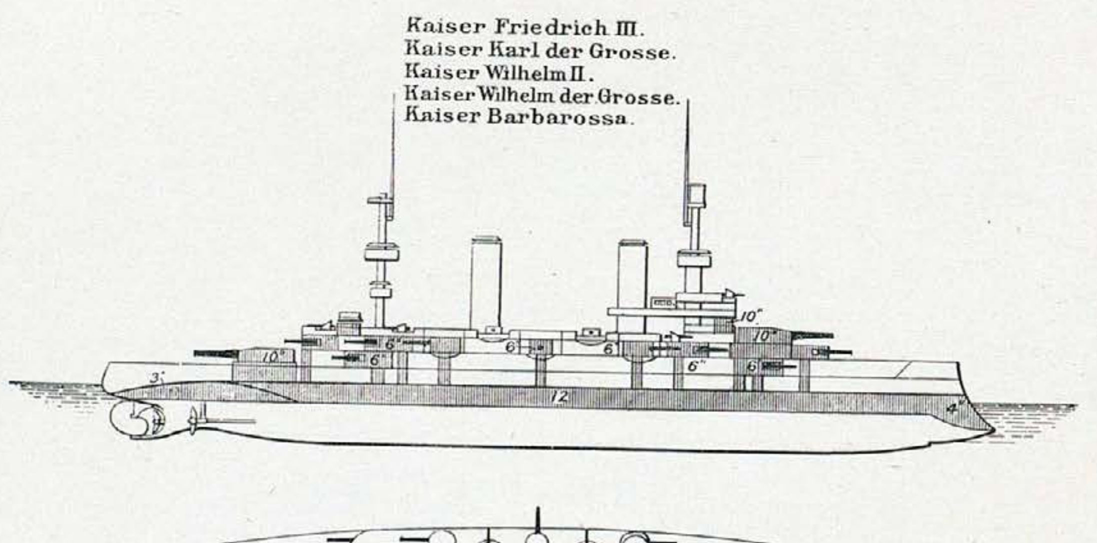
Wittelsbach.
Mecklenburg.
Schwaben.
Wettin.
Zähringen.

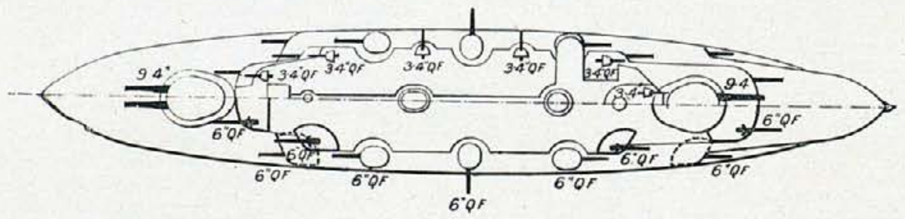




See page 275.

Kaiser Friedrich III.
Kaiser Karl der Grosse.
Kaiser Wilhelm II.
Kaiser Wilhelm der Grosse.
Kaiser Barbarossa.



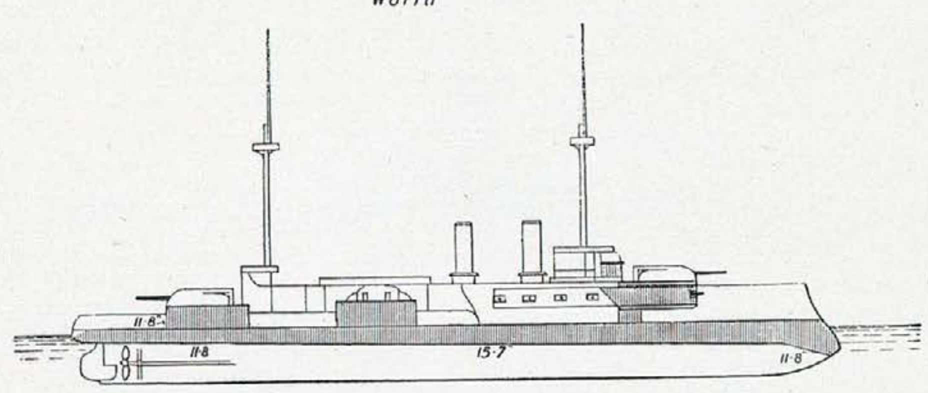


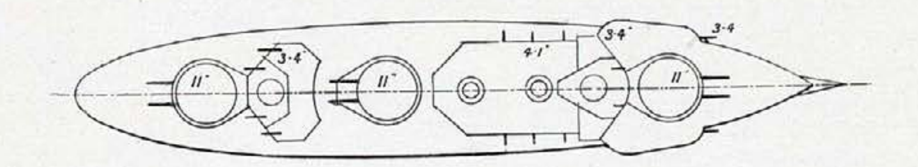
See page 274.

GERMANY.

BATTLESHIPS.

Kürfurst Friedrich Wilhelm.
Brandenburg.
Weissenburg.
Wörth

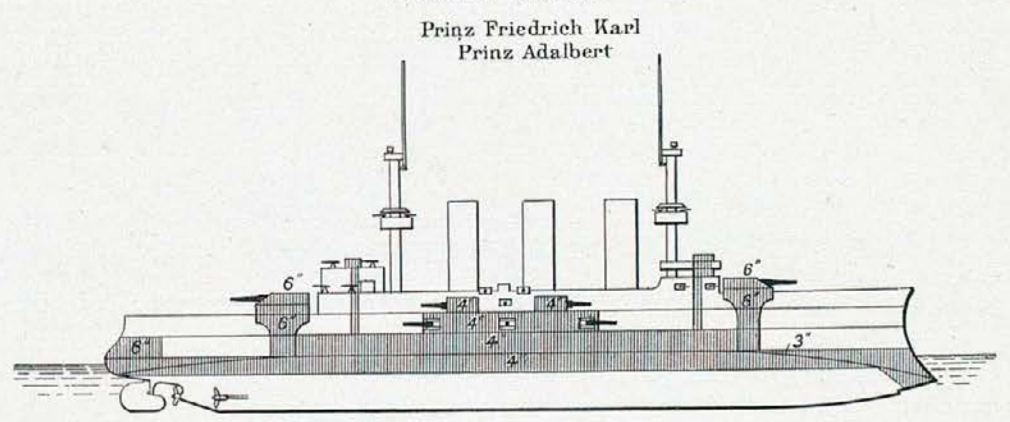


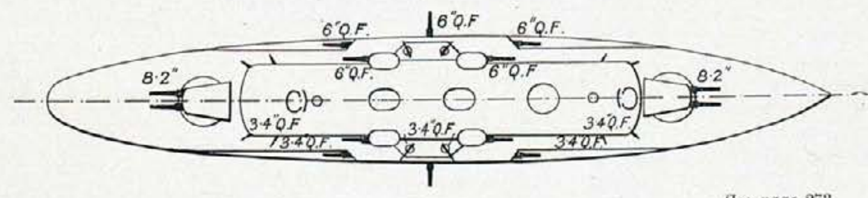


See page 274.

ARMOURED CRUISERS.

Prinz Friedrich Karl
Prinz Adalbert



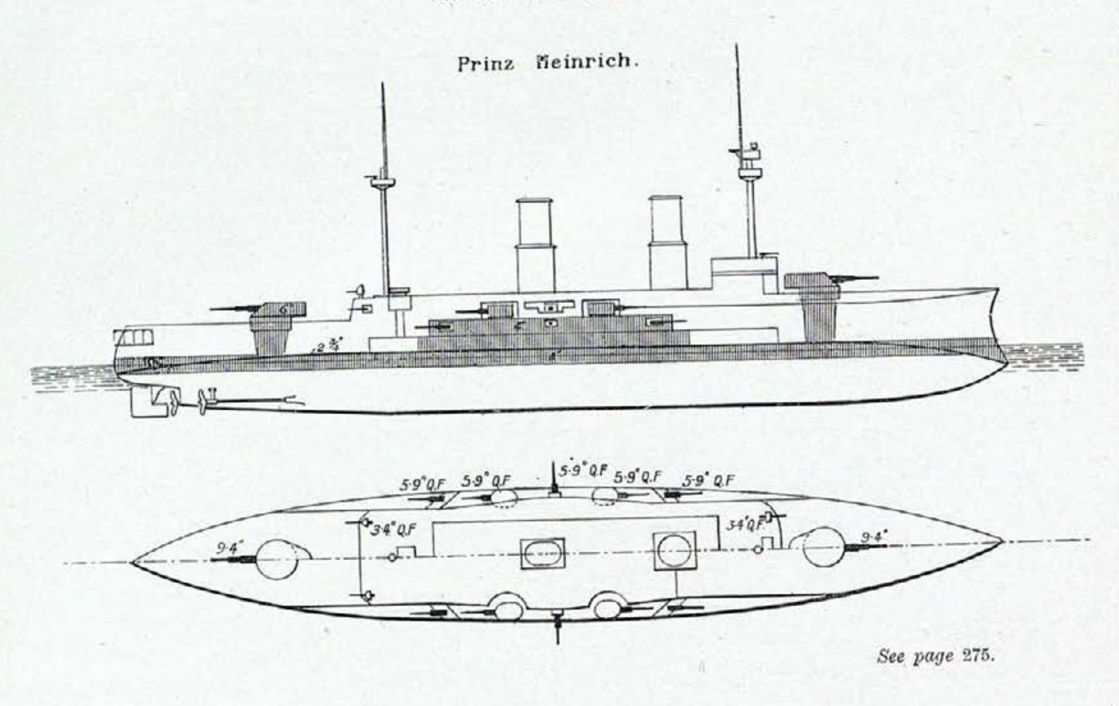


See page 273.

GERMANY.

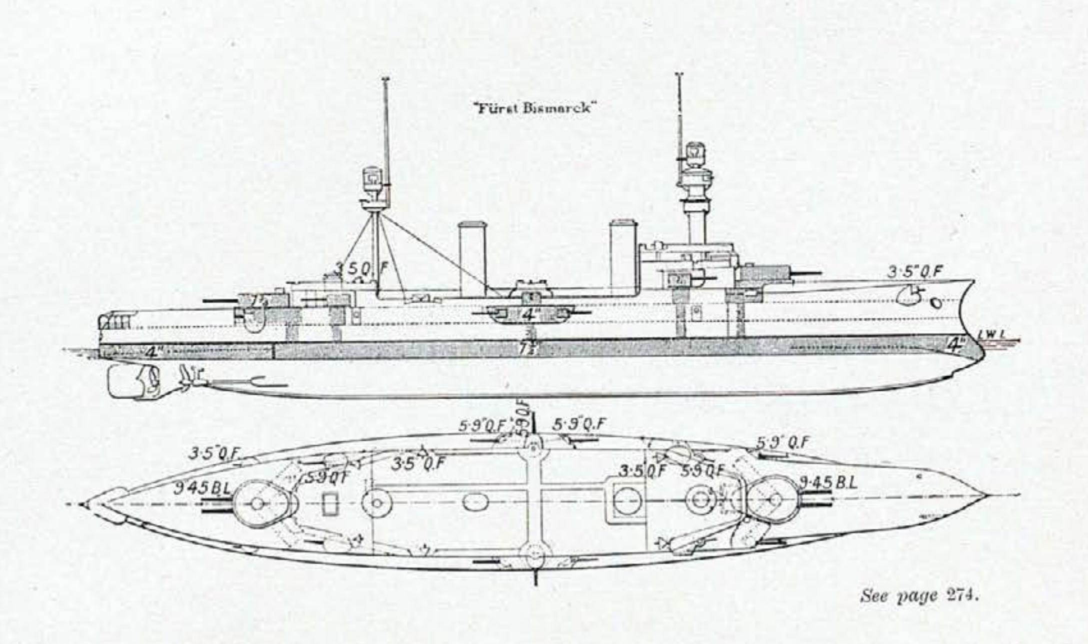
ARMOURED CRUISERS.

Prinz Heinrich.



See page 275.

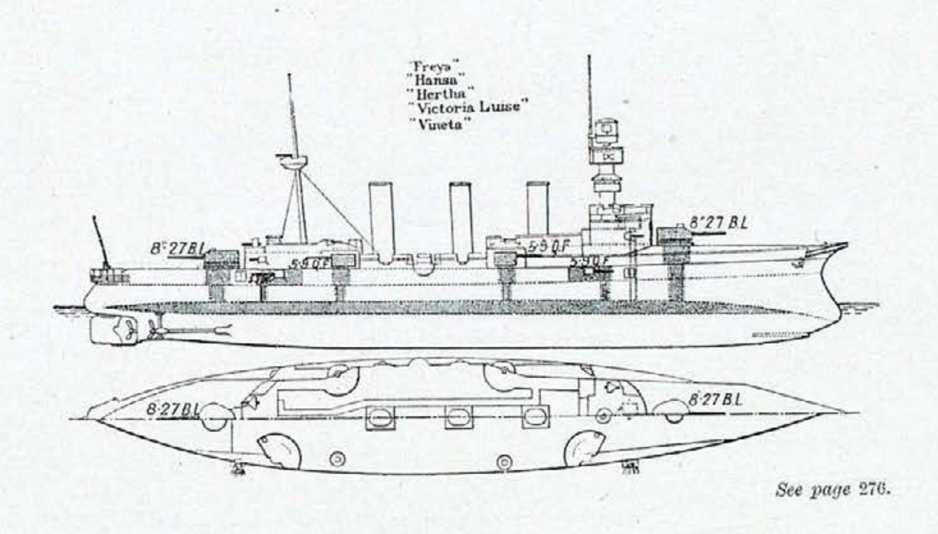
"Fürst Bismarck"



See page 274.

GERMANY.

CRUISERS.

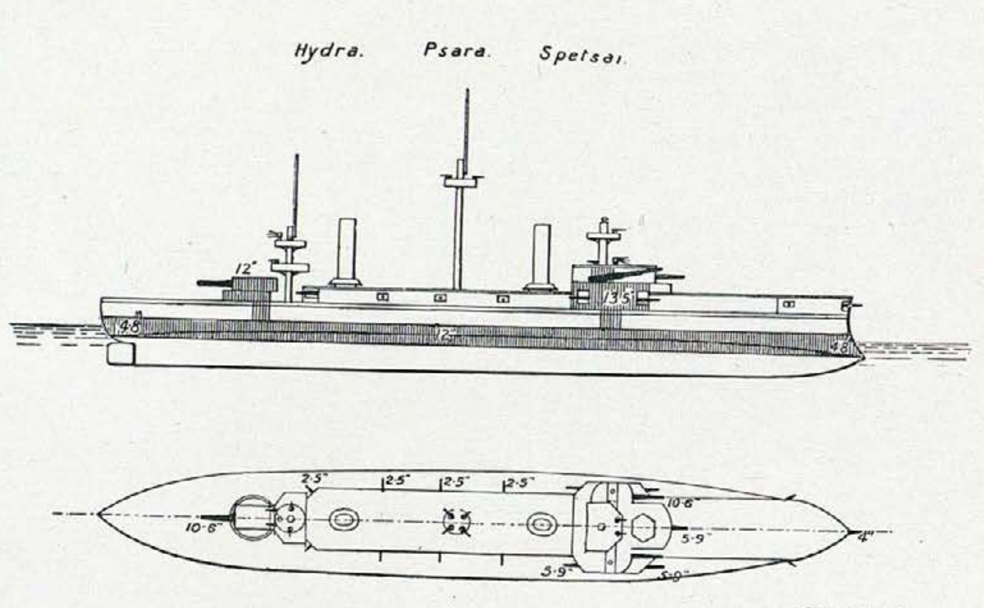


See page 276.

GREECE.

BATTLESHIPS.

Hydra. Psara. Spetsai.

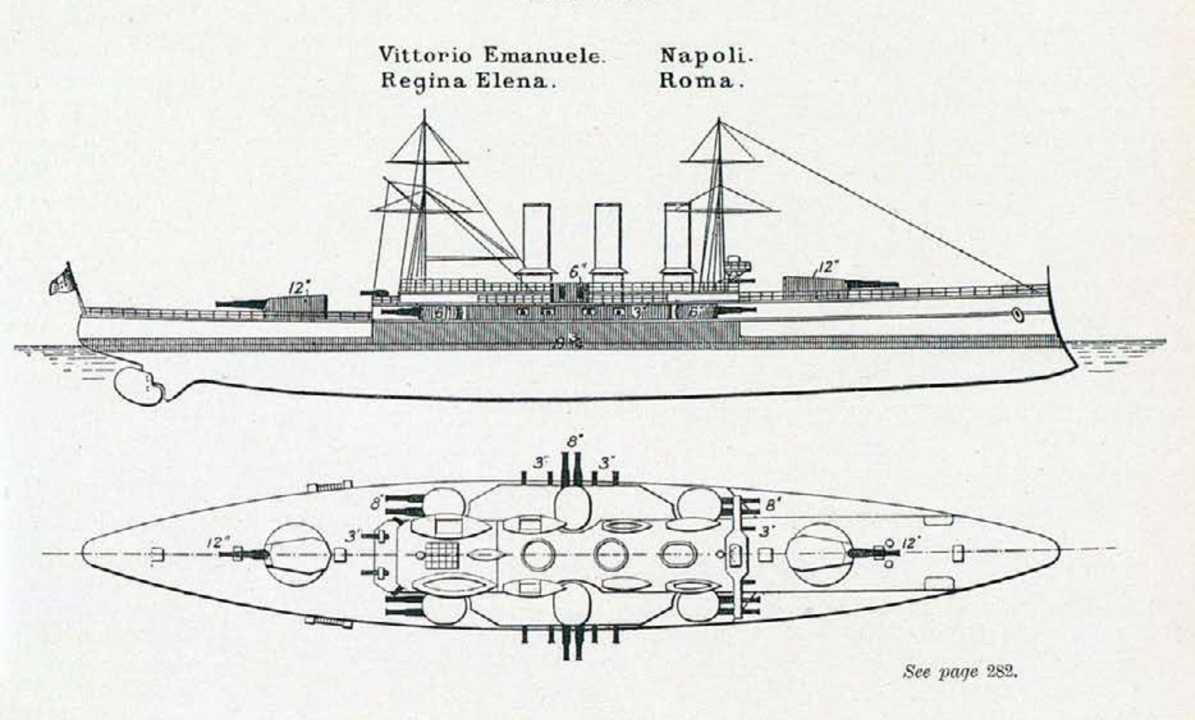


See page 280.

ITALY.

BATTLESHIPS.

Vittorio Emanuele. Napoli.
Regina Elena. Roma.



See page 282.

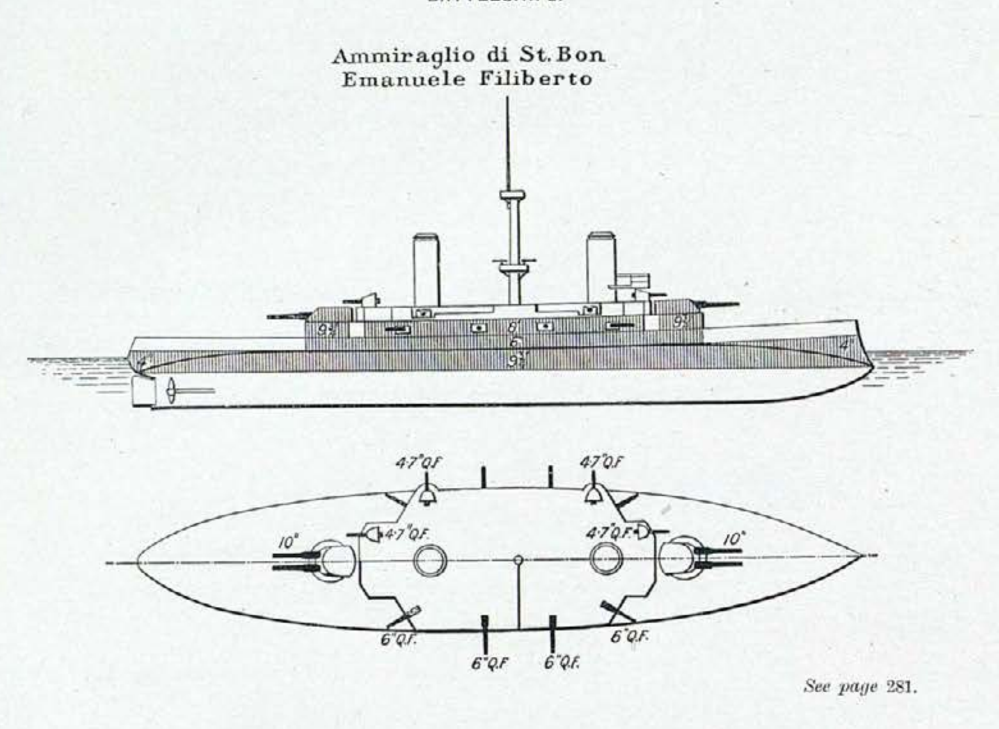
Benedetto Brin.
Regina Margherita.

See page 281.

ITALY.

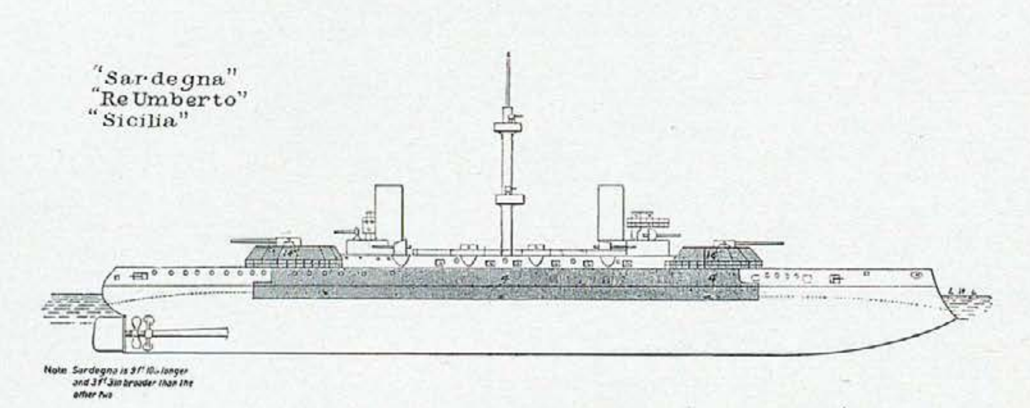
BATTLESHIPS.

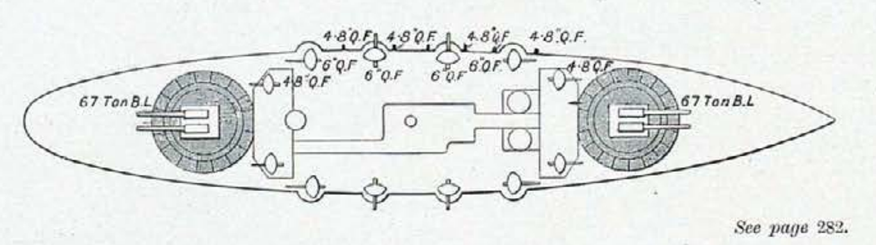
Ammiraglio di St. Bon
Emanuele Filiberto



See page 281.

"Sardegna"
"Re Umberto"
"Sicilia"



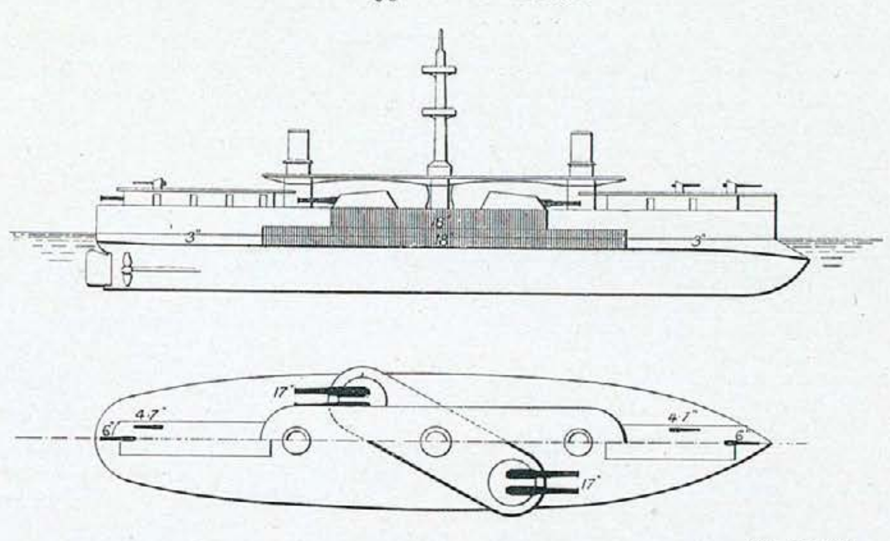


See page 282.

ITALY.

BATTLESHIPS.

Andrea Doria.
Francesco Morosini.
Ruggiero di Lauria.



See page 281.

Italia.
Lepanto. ※

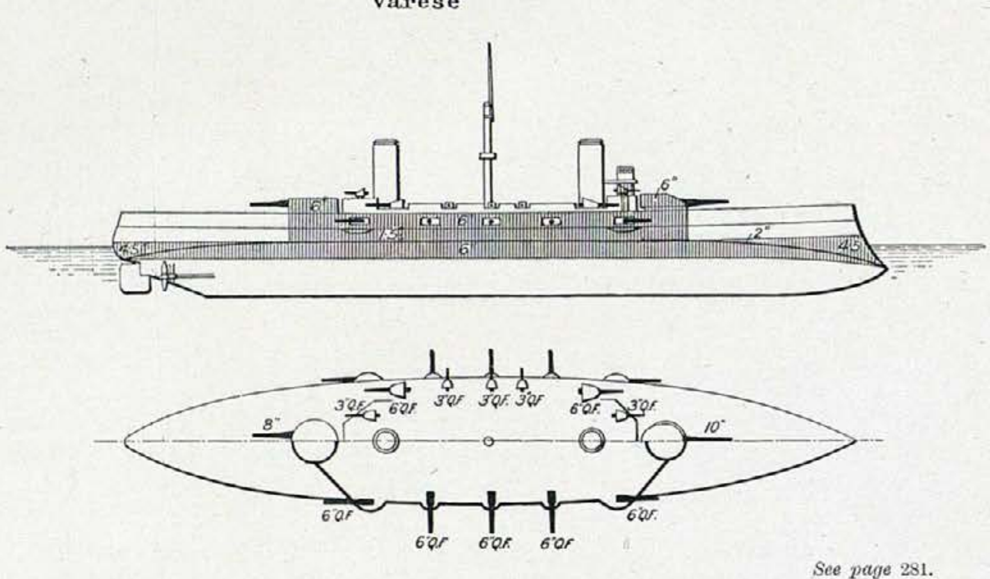
※ The Lepanto has Four Funnels.

See page 281.

ITALY.

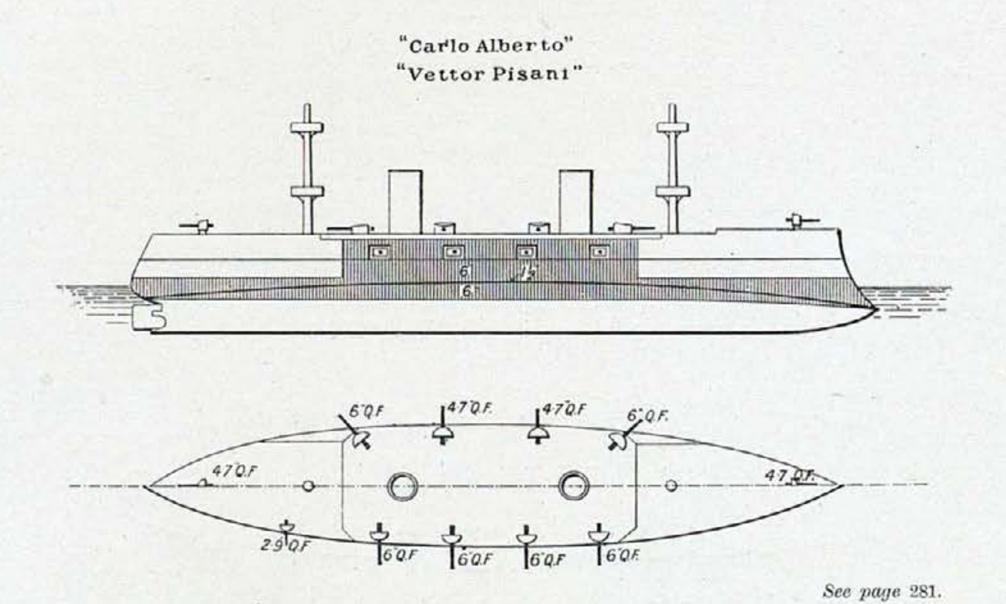
ARMOURED CRUISERS.

Francesco Ferrucio
Guiseppe Garibaldi
Varese



See page 281.

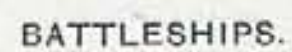
"Carlo Alberto"
"Vettor Pisani"



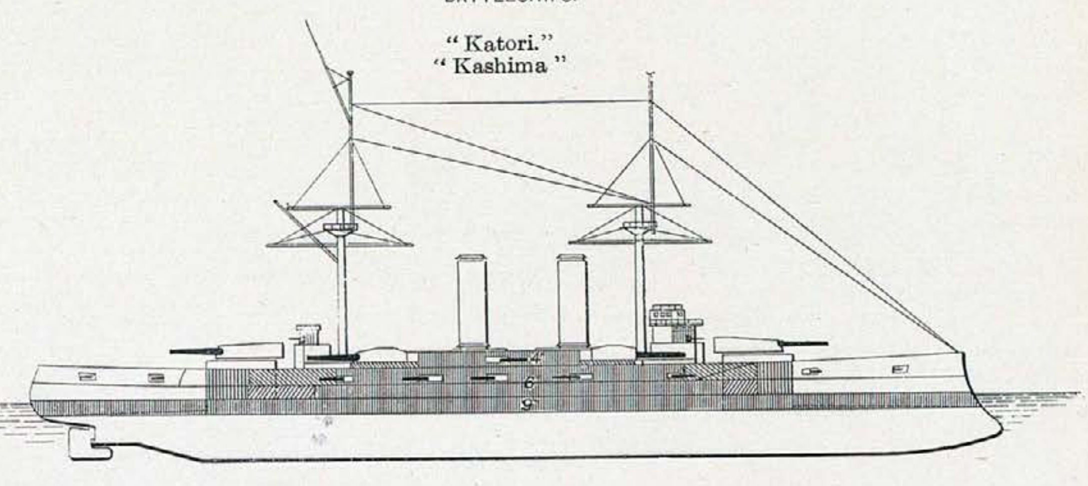
See page 281.

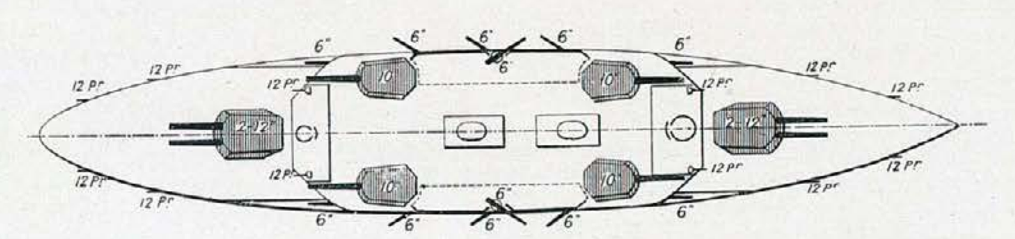
JAPAN.

BATTLESHIPS.



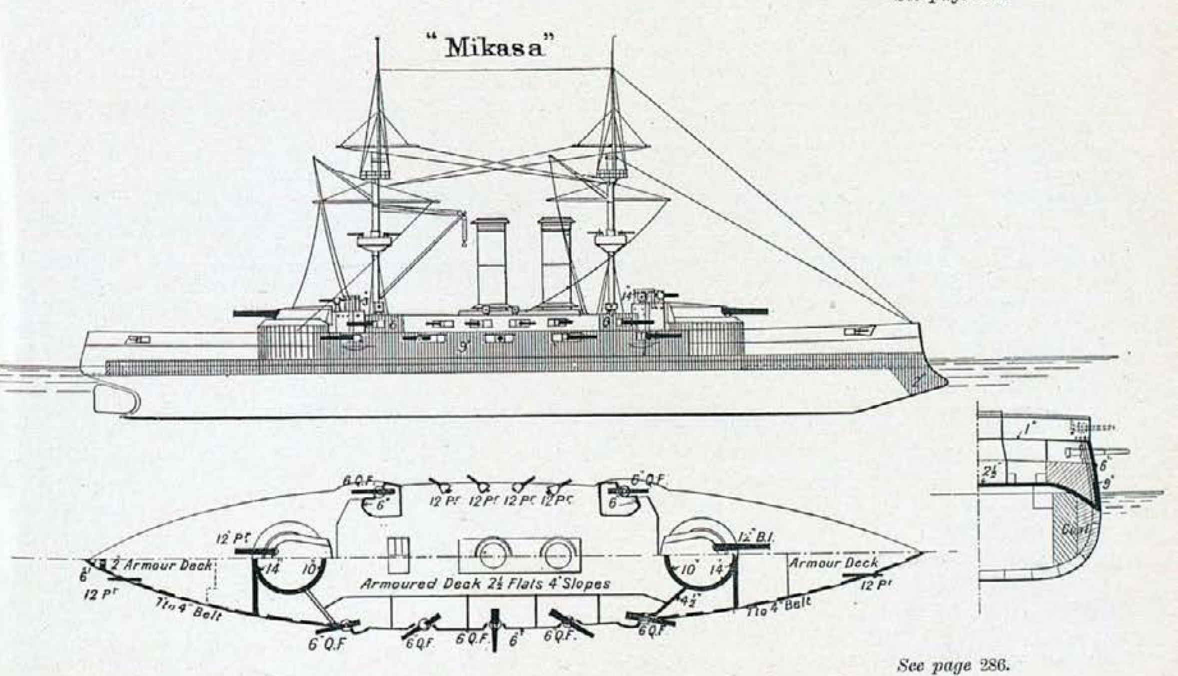
"Katori."
"Kashima"





See page 286.

"Mikasa"

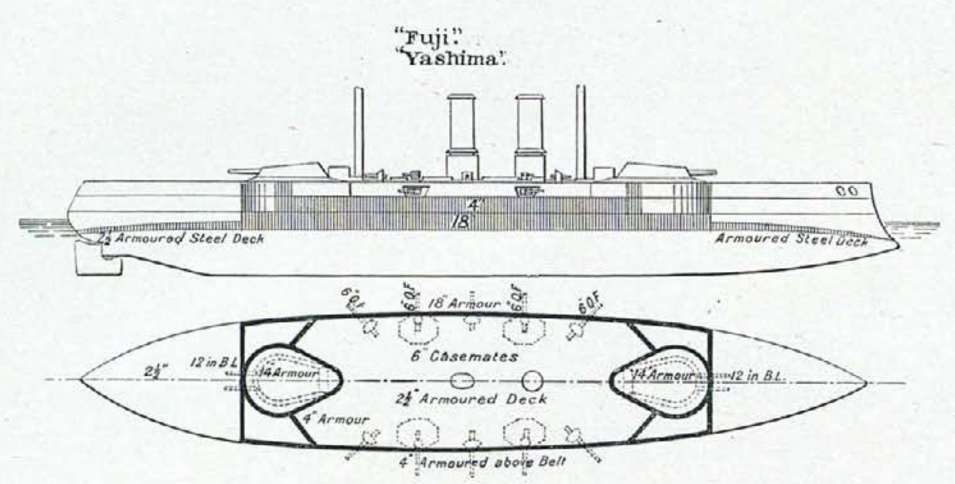


See page 286.

JAPAN.

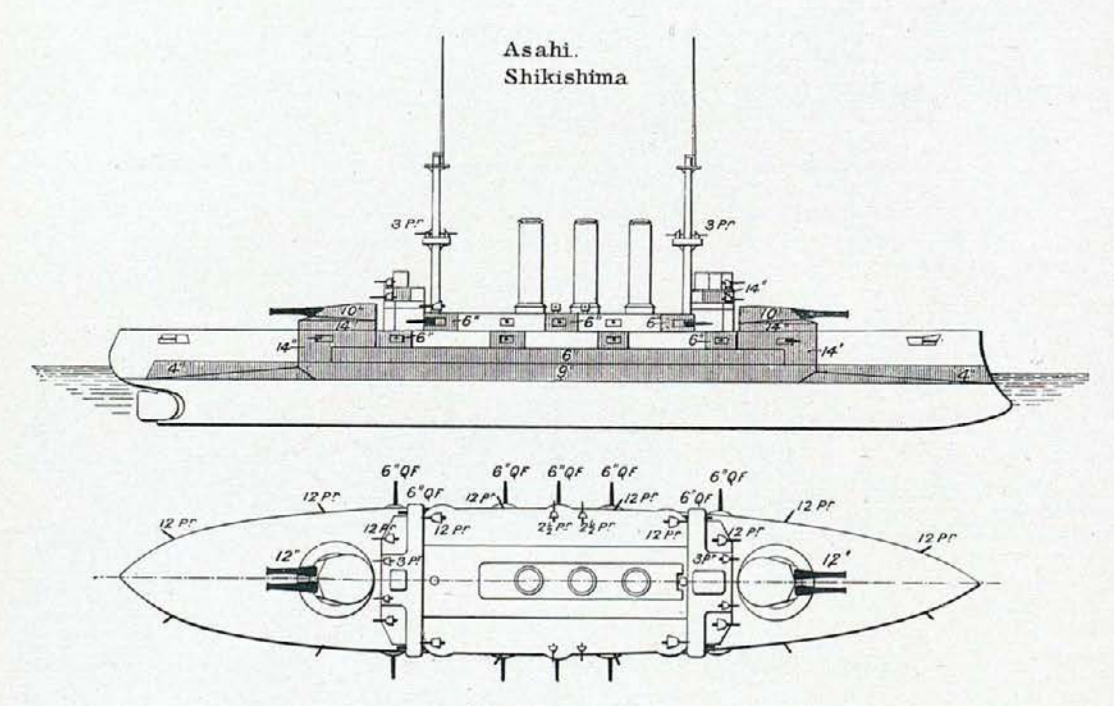
BATTLESHIPS.

"Fuji."
"Yashima."



See page 286.

Asahi.
Shikishima



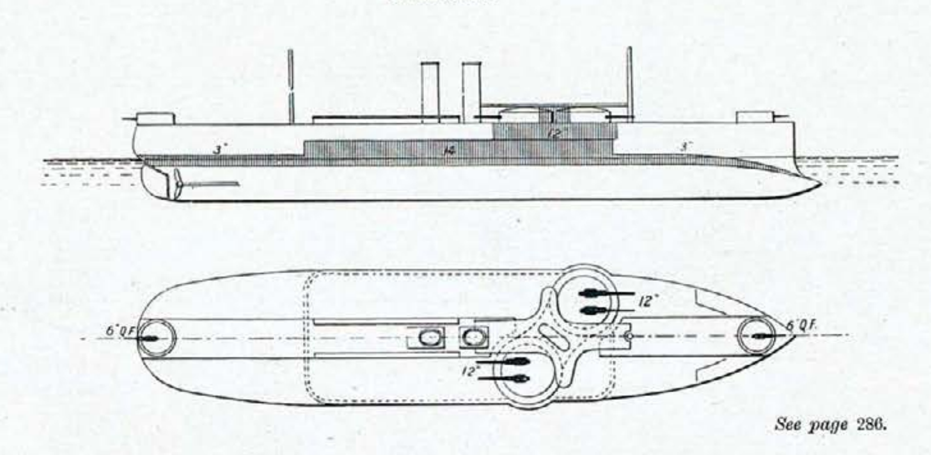
The "Asahi" has but two funnels.

See page 286.

JAPAN.

BATTLESHIP.

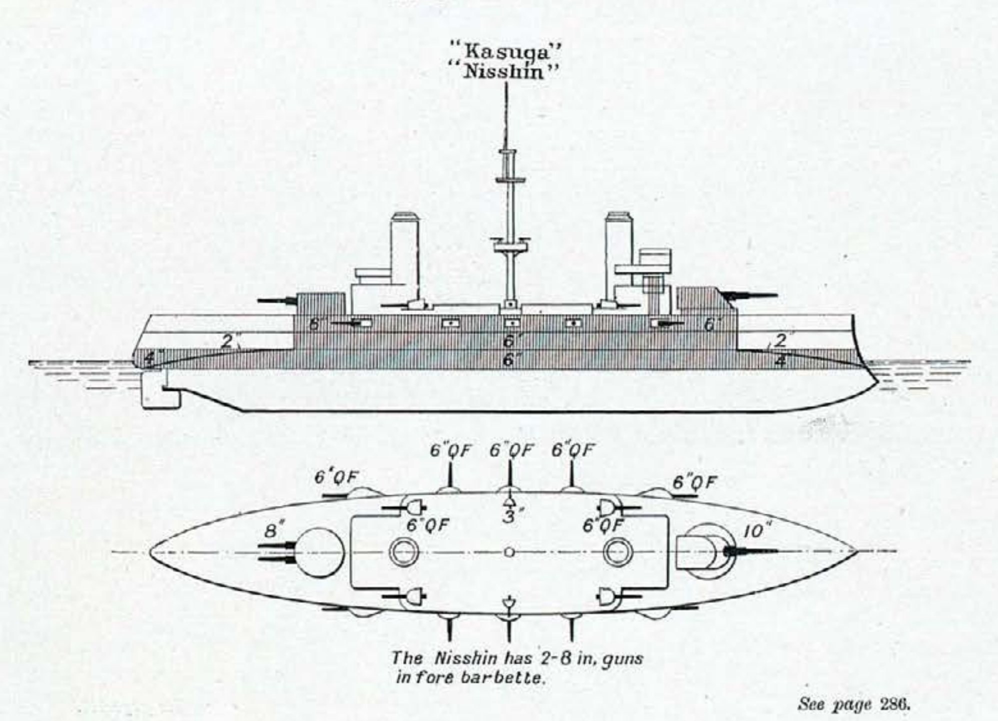
Chin Yen.



See page 286.

ARMOURED CRUISERS.

"Kasuga"
"Nisshin"



The Nisshin has 2-8 in. guns in fore barbette.

See page 286.

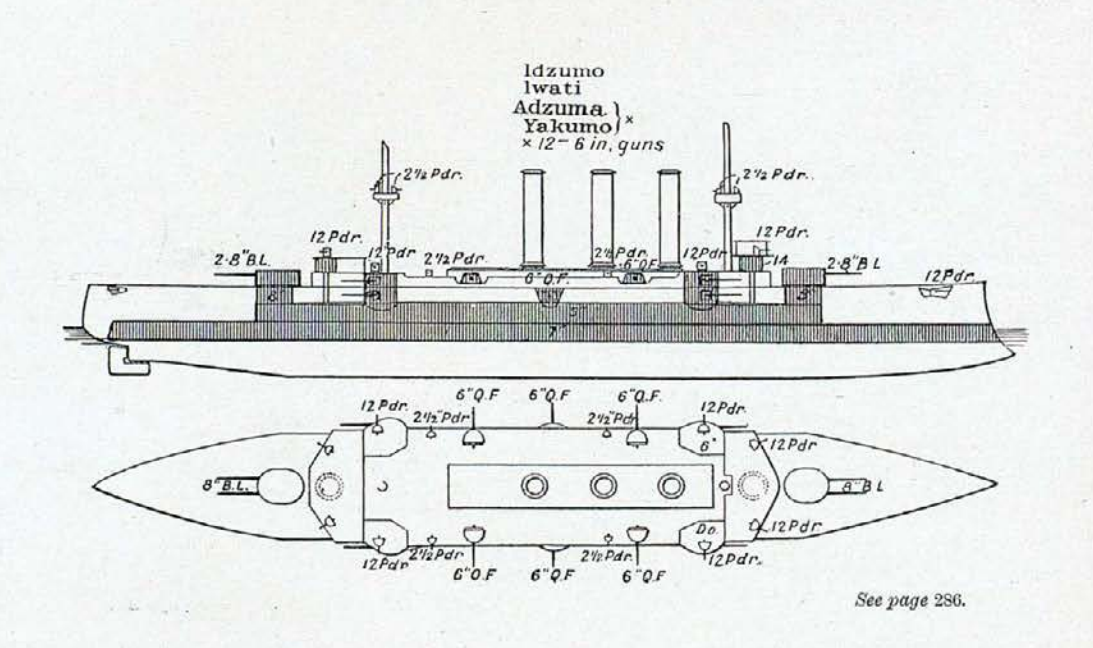
JAPAN.

ARMOURED CRUISERS.

Asama and Tokiwa

6"
7"
5"
3"
6" Q.F.
2·8" Q.F.

See page 286.

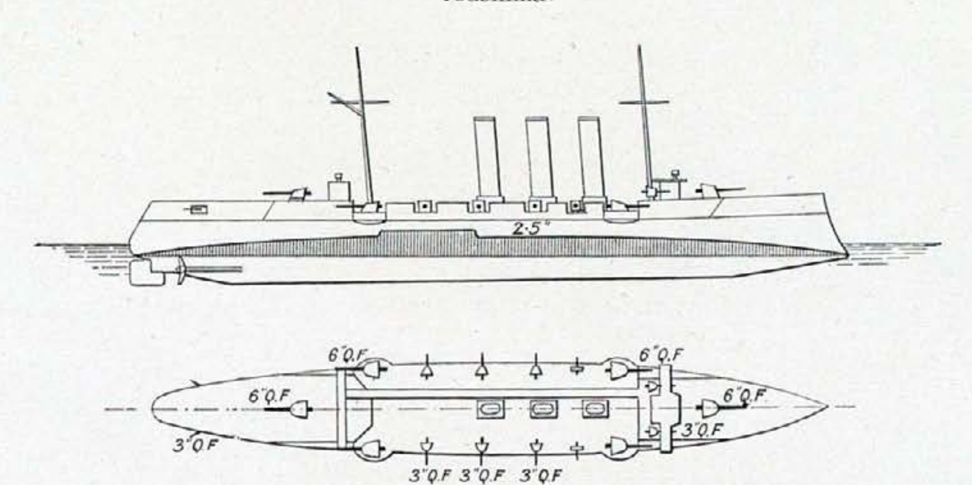


See page 286.

JAPAN.

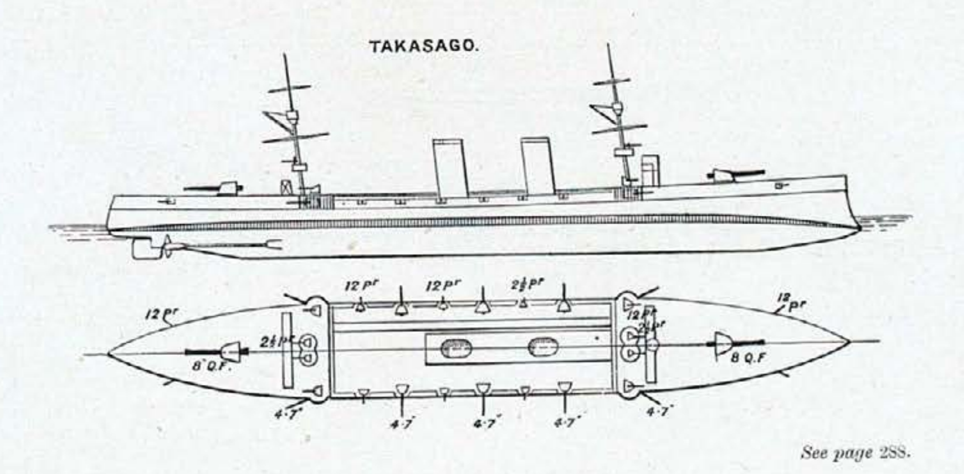
CRUISERS.

Niitaka.
Tsushima.



See page 288.

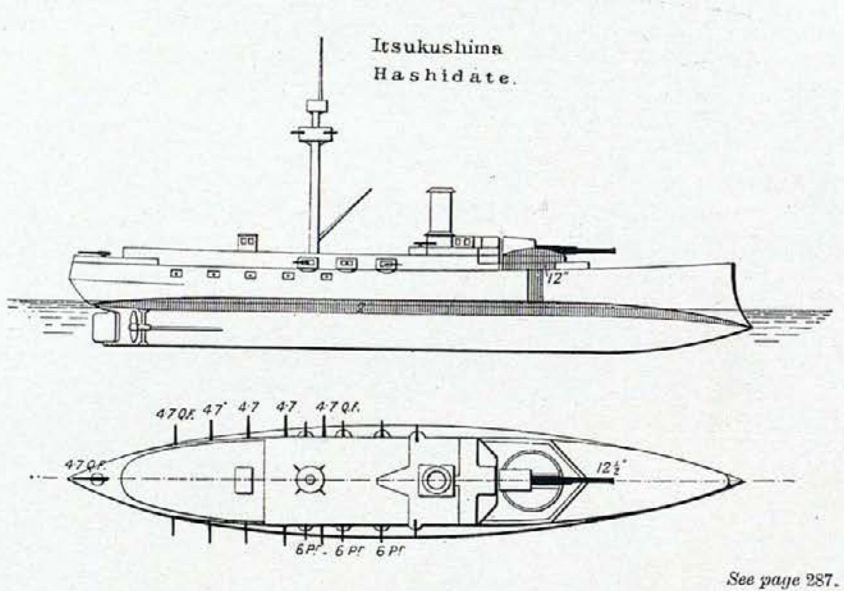
TAKASAGO.



See page 288.

JAPAN.

CRUISERS.

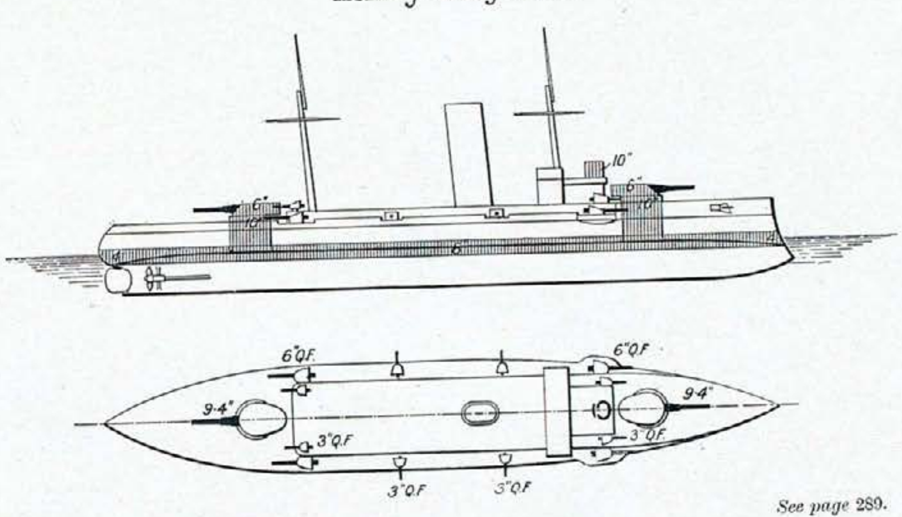


See page 287.

NETHERLANDS.

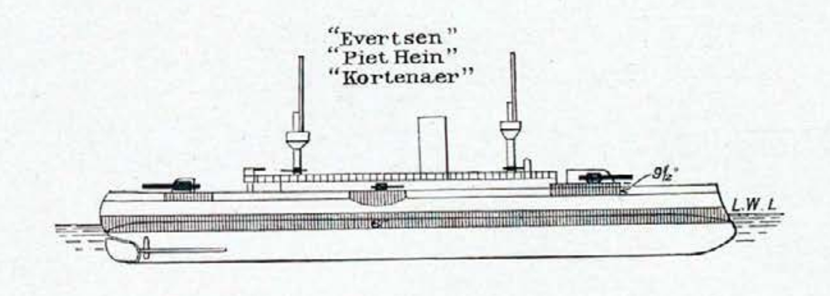
COAST DEFENCE SHIPS.

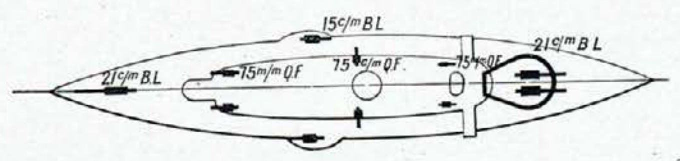
De Ruyter
Hertog Hendrik
Koningin Regentes.



See page 289.





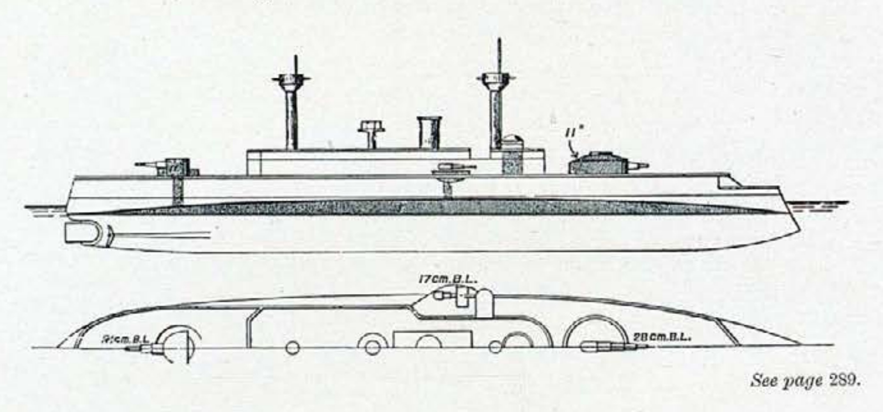


See page 289.

NETHERLANDS.

BATTLESHIP.

Koningin Wilhelmina der Nederlanden.

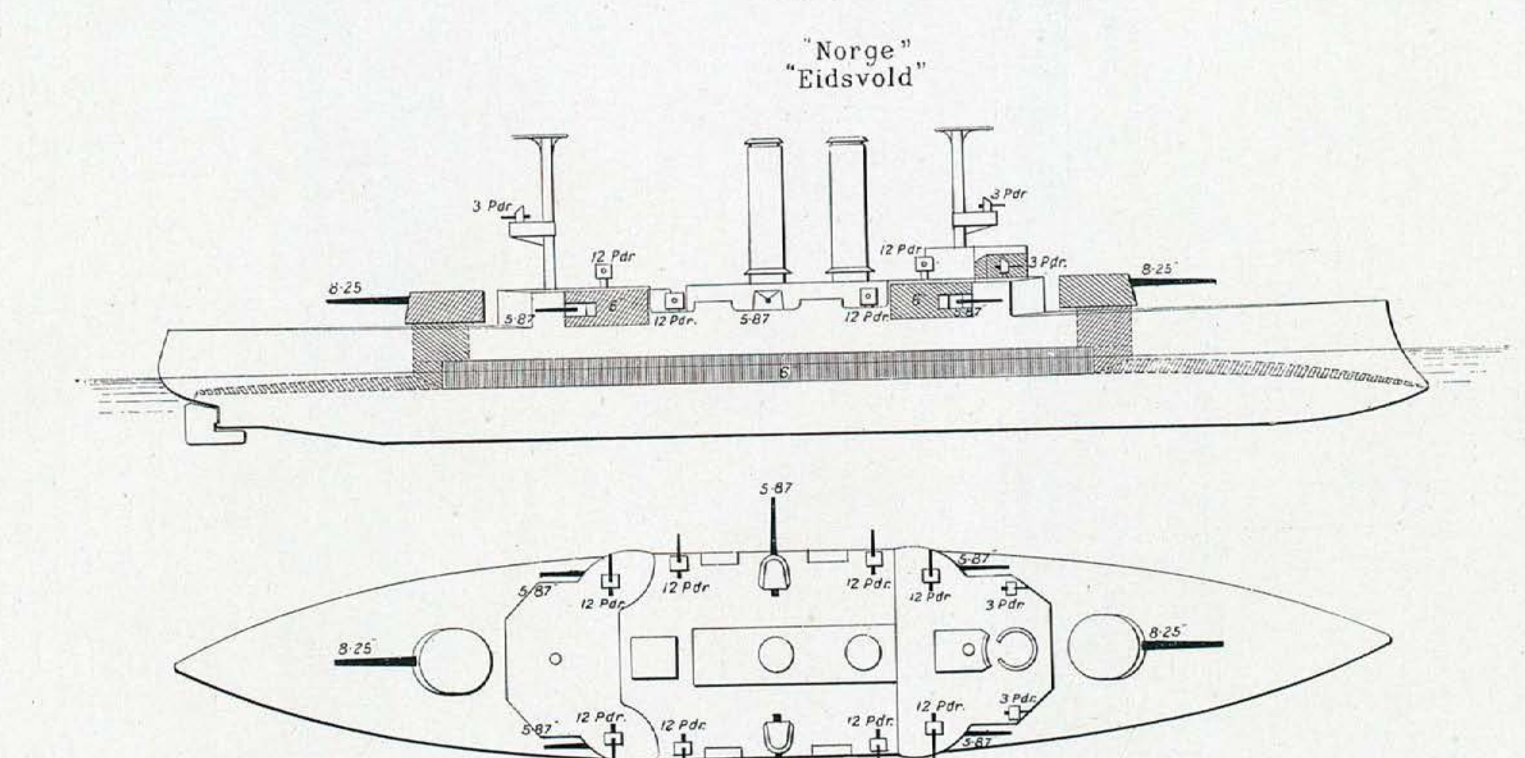


See page 289.

NORWAY.

BATTLESHIPS.

"Norge"
"Eidsvold"



See page 292.

RUSSIA.

BATTLESHIPS.

"Borodino"
"Imp. Alexander III"
"Kniaz Souvaroff"
"Orel"
"Slava"

See page 295.

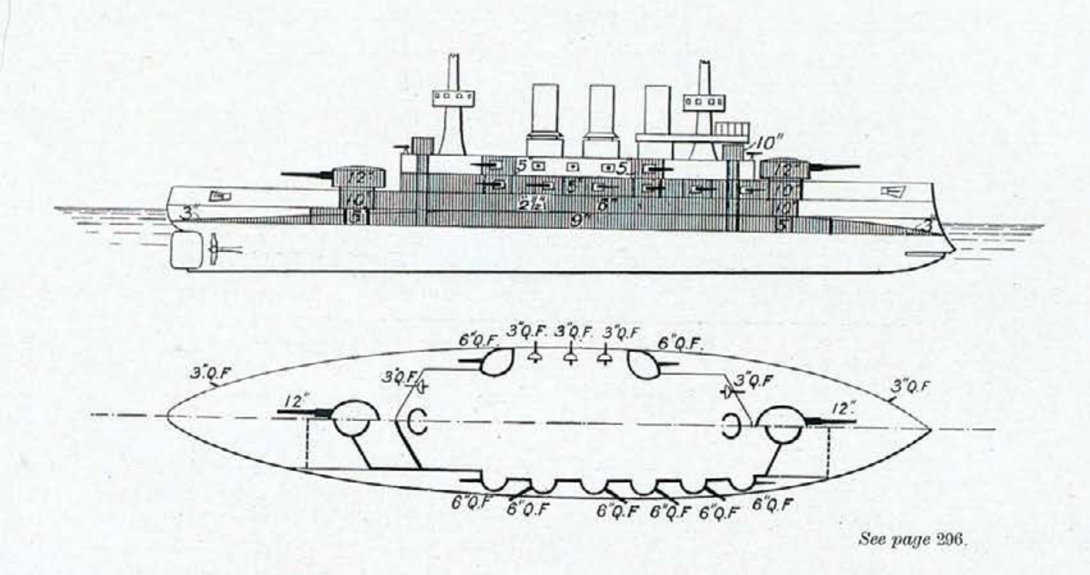
Cesarevitch

See page 295.

RUSSIA.

BATTLESHIPS.

Kniaz Potemkin Tavritchesky



See page 296.

"Oslabya"
"Peresviet"
"Pobieda"

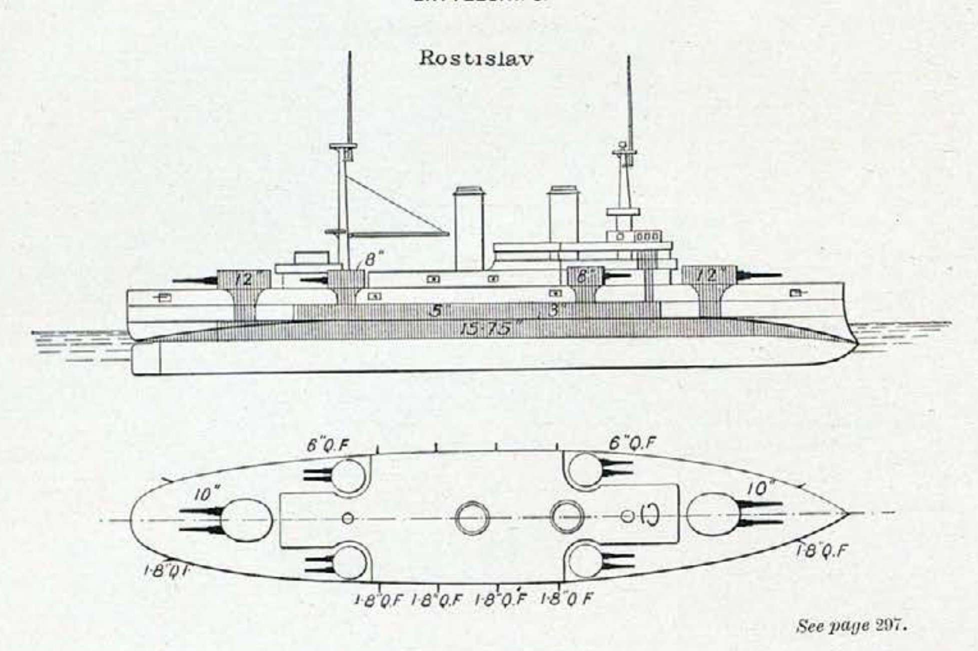
Note: In the "Pobieda" the Belt Extends the Full Length of the Ship.

See page 297.

RUSSIA.

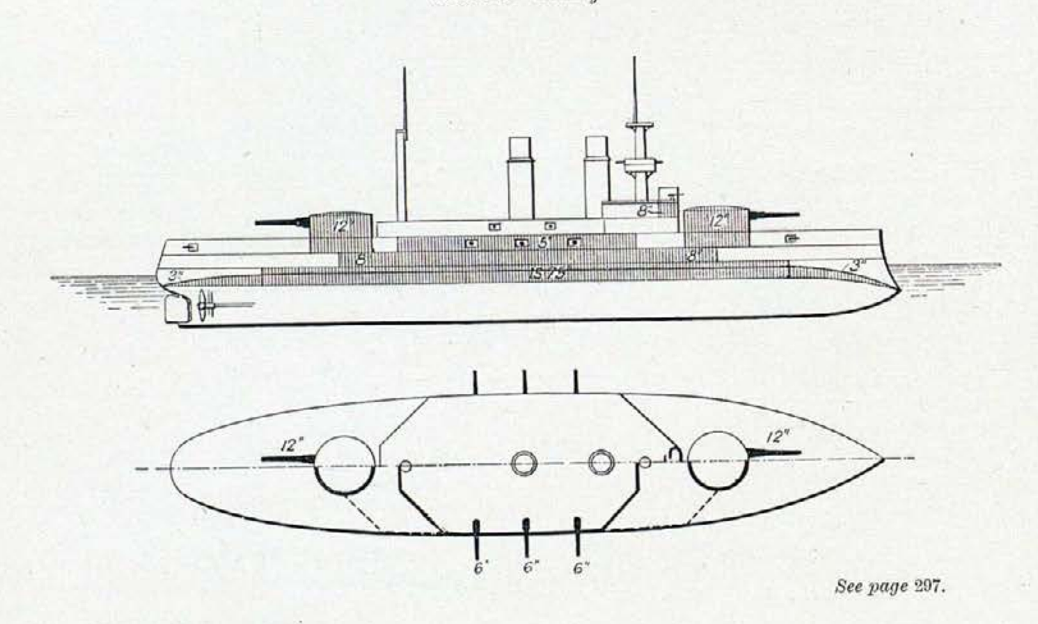
BATTLESHIPS.

Rostislav



See page 297.

Sissoi Veliky

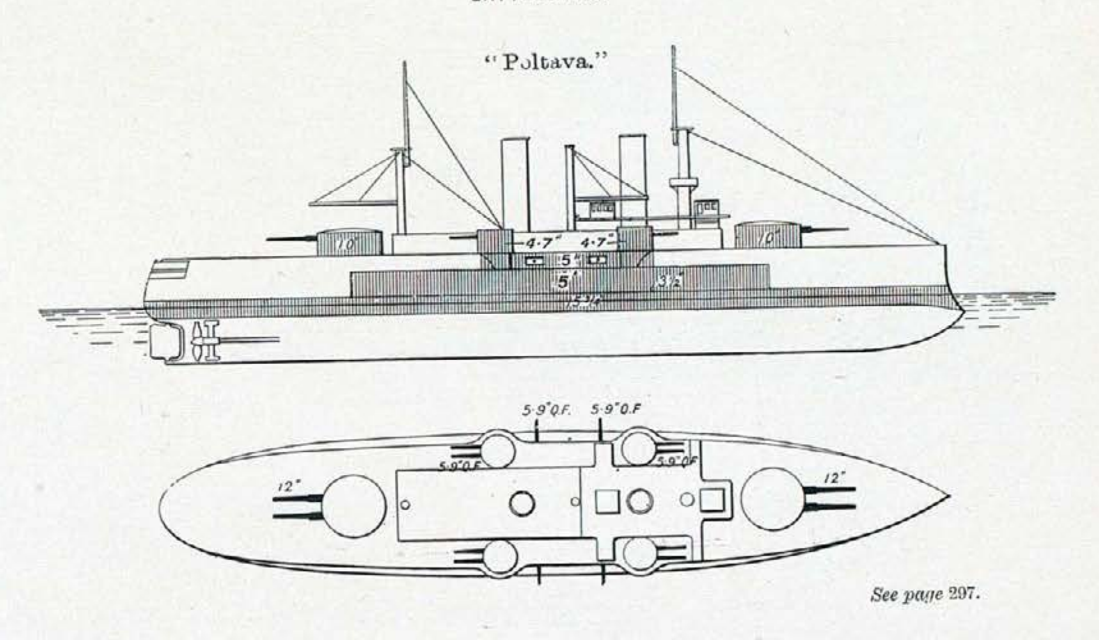


See page 297.

RUSSIA.

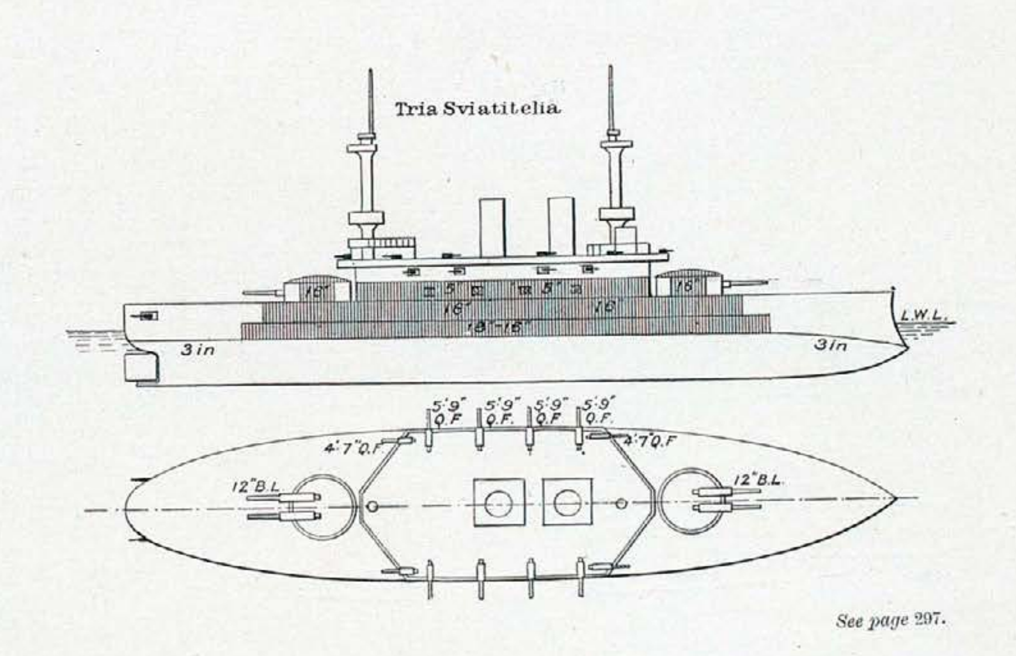
BATTLESHIPS.

"Poltava."



See page 297.

Tria Sviatitelia

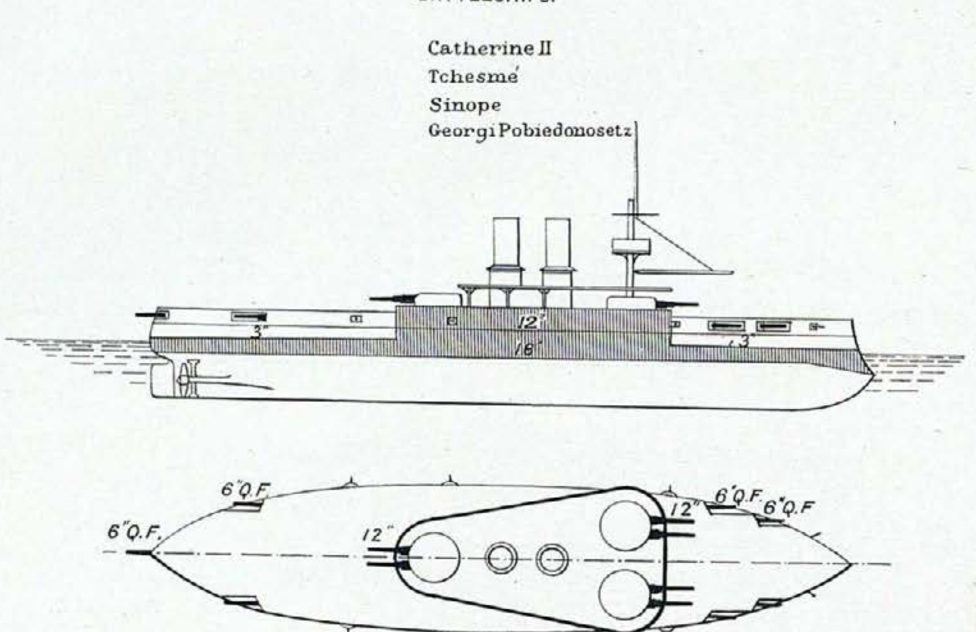


See page 297.

RUSSIA.

BATTLESHIPS.

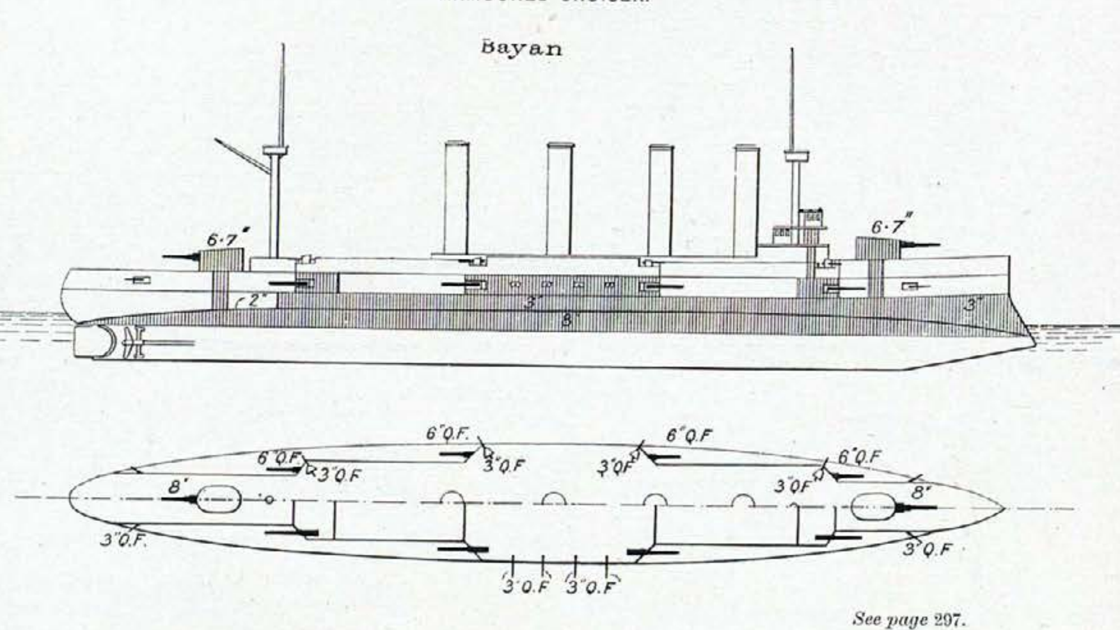
Catherine II
Tchesmé
Sinope
Georgi Pobiedonosetz



See page 295.

ARMOURED CRUISER.

Bayan



See page 297.

RUSSIA.

ARMOURED CRUISERS.

"Gromoboi".

1·8" Q.F.
4·7"
3"
6"
3"

8"
3" Q.F.
3" Q.F.
3" Q.F.
3" Q.F.
3" Q.F.
8"
6" Q.F.
3" Q.F.
3" Q.F.
6" Q.F.
6" Q.F.
1·8" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.

See page 296.

Rossia

9"
9"
2¼"
10"
2¼"

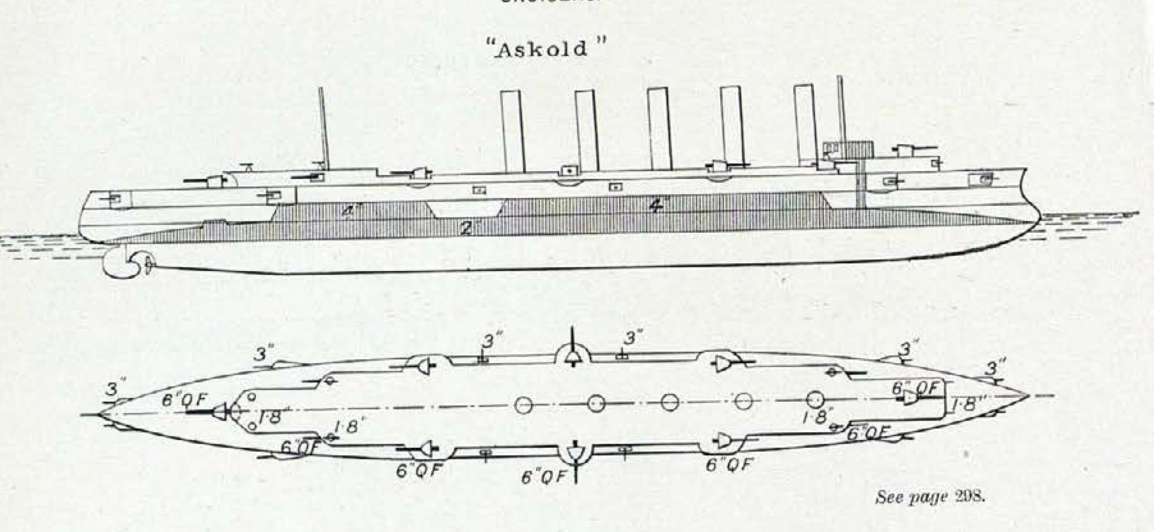
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6" Q.F.
6"
6" Q.F.
6" Q.F.
1·8"
3" Q.F.
8"
1·8"
1·8"
1·8"
1·8"
1·8"
3" Q.F.
3" Q.F.
3" Q.F.
8"
3" Q.F.
1·8"
1·8"
6" Q.F.
3" Q.F.
1·8"

See page 297.

RUSSIA.

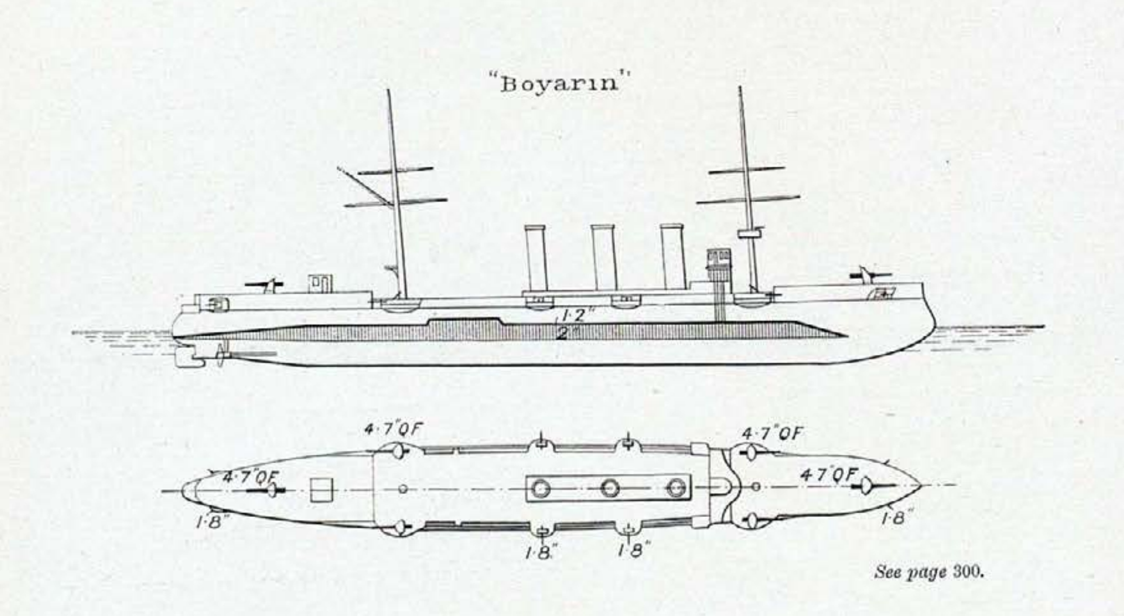
CRUISERS.

"Askold"



See page 298.

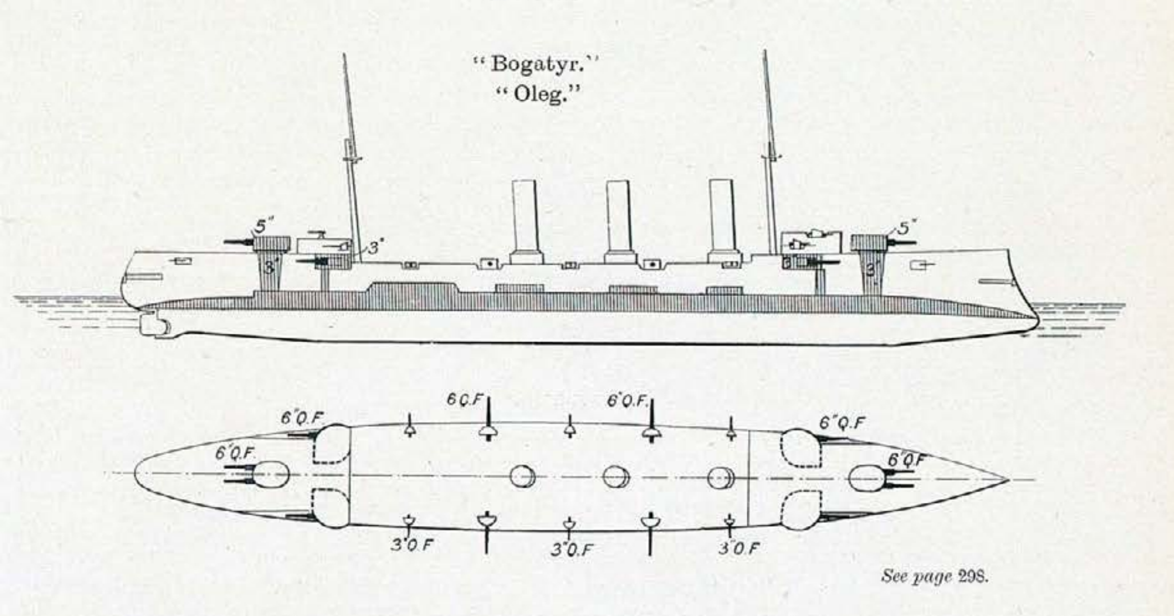
"Boyarin"



See page 300.

RUSSIA.

CRUISERS



See page 298.

Aurora.
Diana.

2½"

6"Q.F. 6"Q.F. 6"Q.F. 6"Q.F 6"Q.F.

3"Q.F 3"Q.F 3"Q.F 3"Q.F

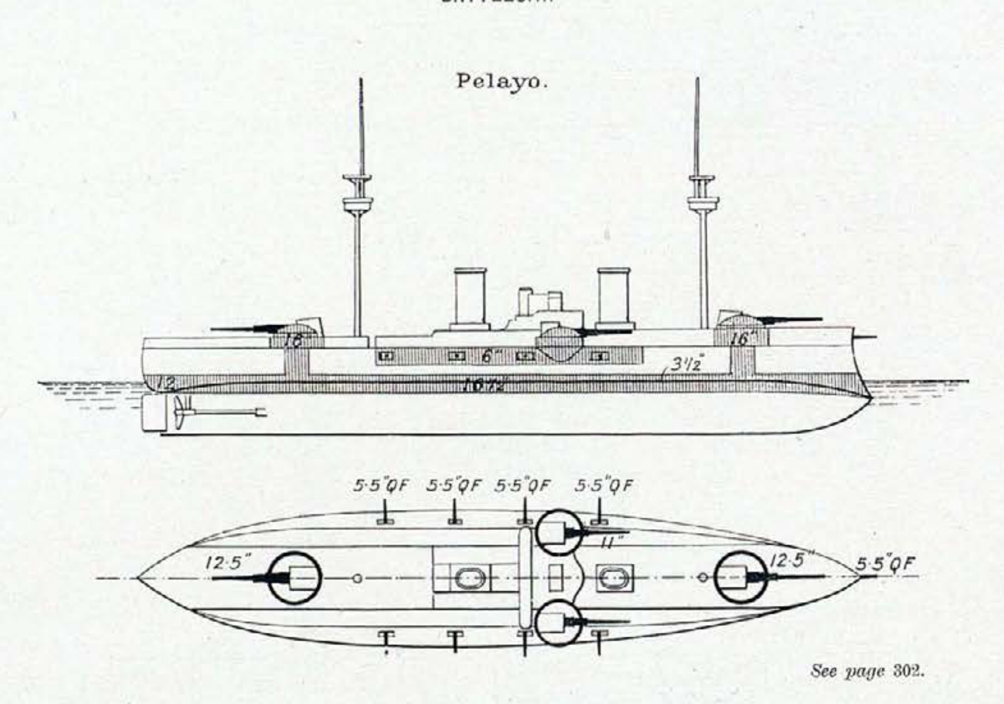
3"Q.F. 3"Q.F 3"Q.F 3"Q.F 3"Q.F 3"Q.F.

See page 298.

SPAIN.

BATTLESHIP

Pelayo.

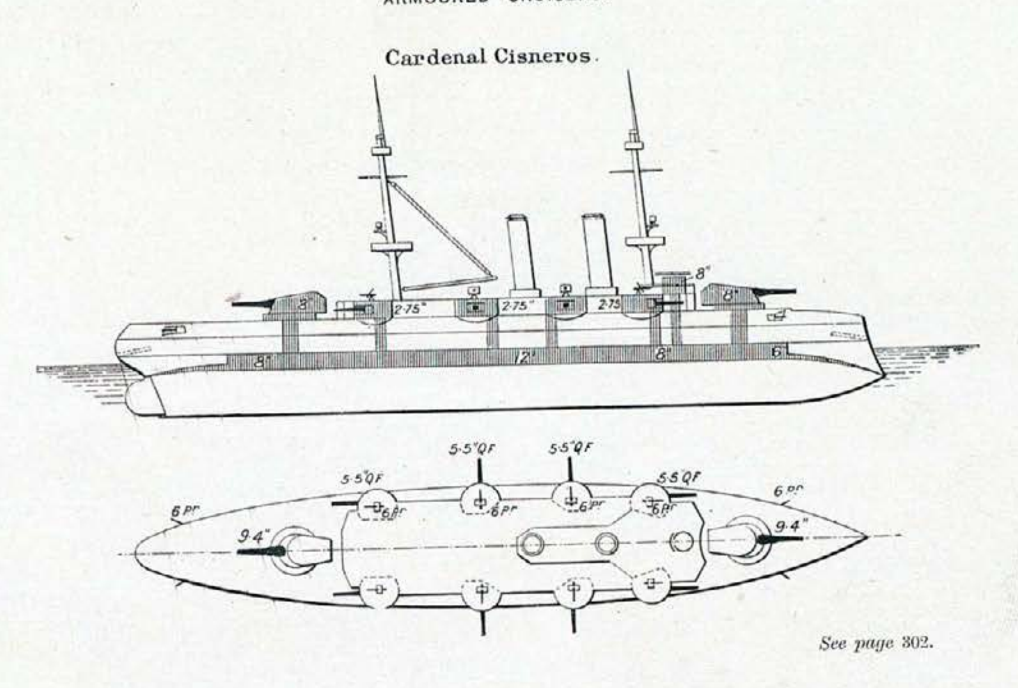


See page 302.

SPAIN.

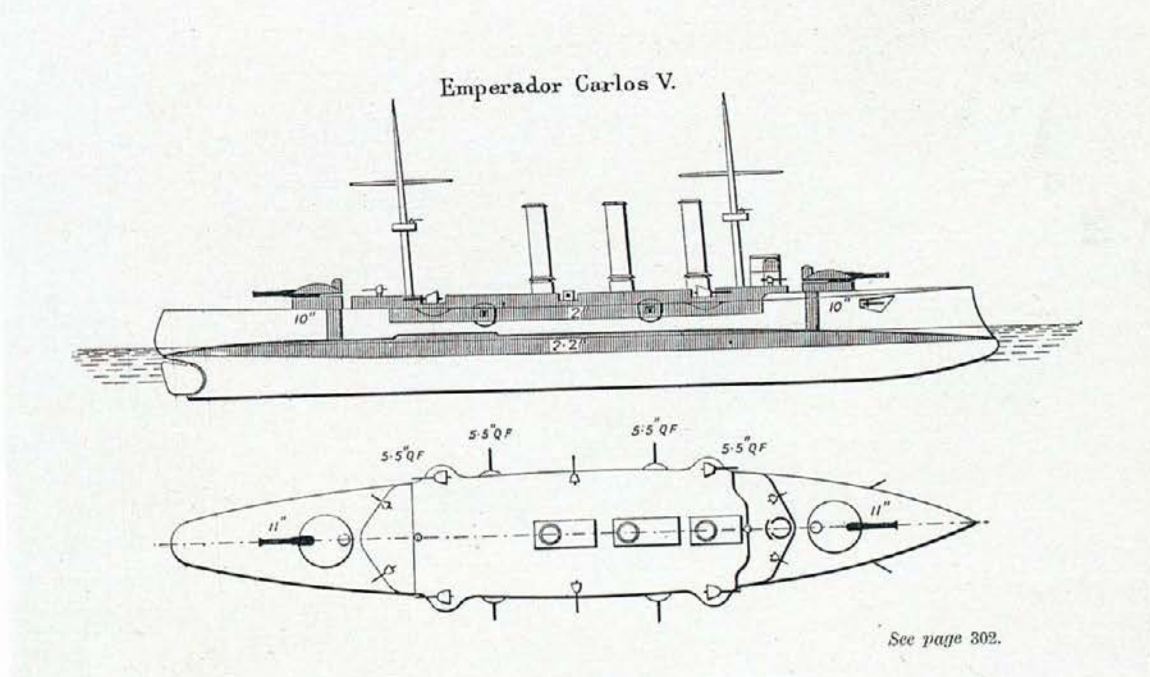
ARMOURED CRUISERS.

Cardenal Cisneros.



See page 302.

Emperador Carlos V.

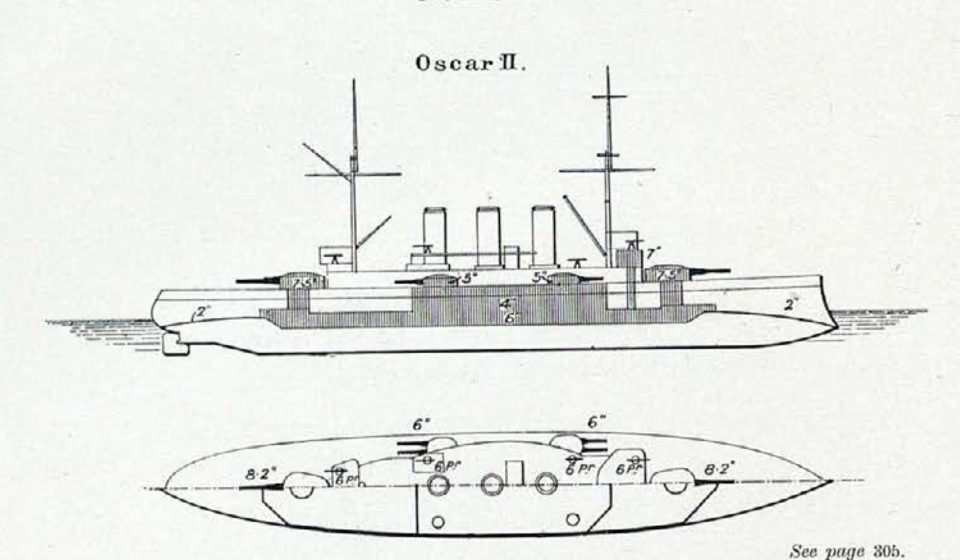


See page 302.

SWEDEN.

BATTLESHIP.

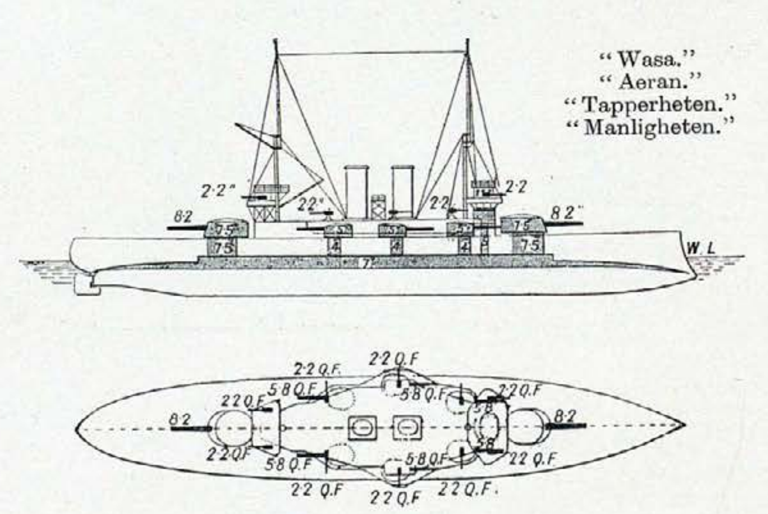
Oscar II.



See page 305.

COAST DEFENCE SHIPS.

"Wasa."
"Aeran."
"Tapperheten."
"Manligheten."

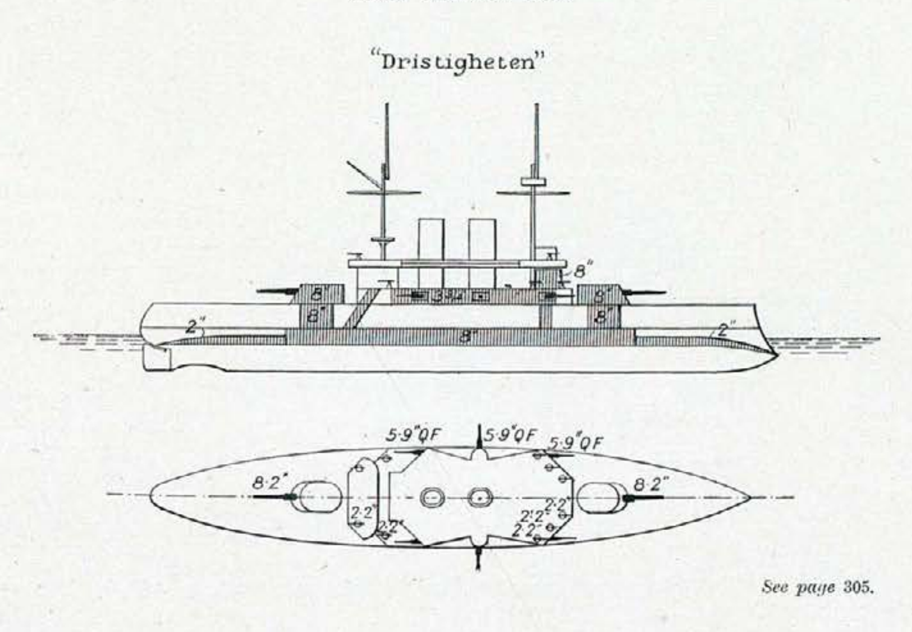


See page 305.

SWEDEN.

COAST DEFENCE SHIP.

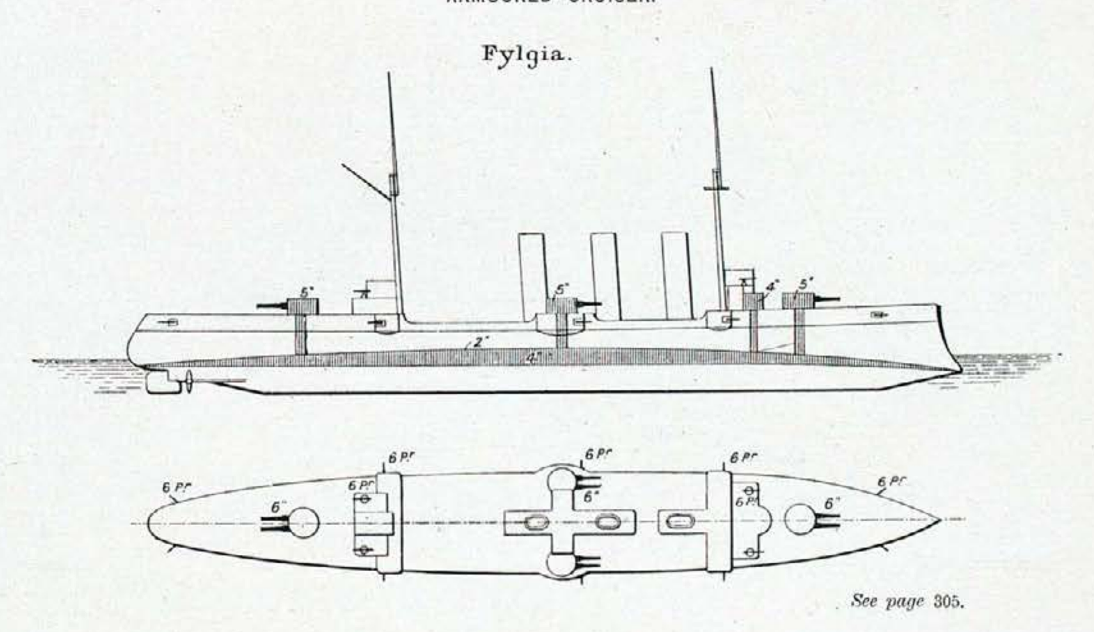
"Dristigheten"



See page 305.

ARMOURED CRUISER.

Fylgia.

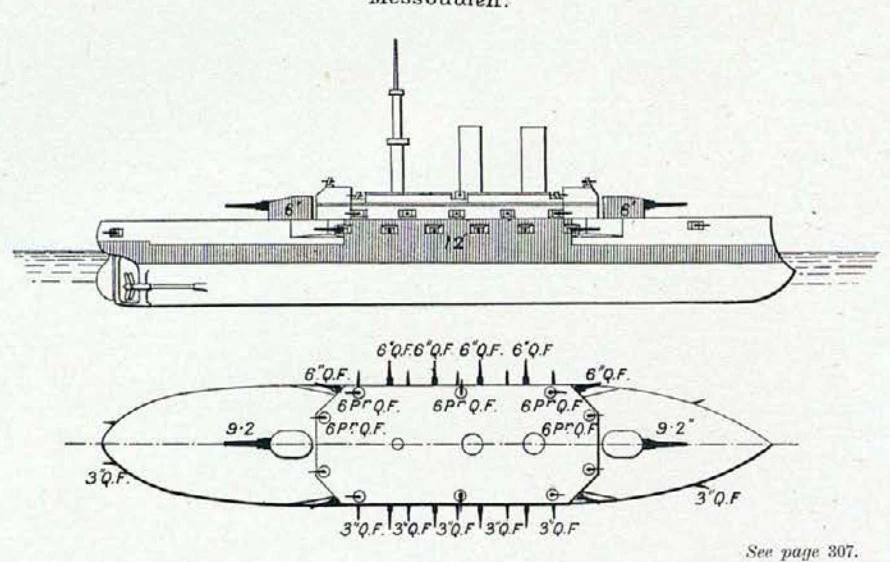


See page 305.

TURKEY.

BATTLESHIP.

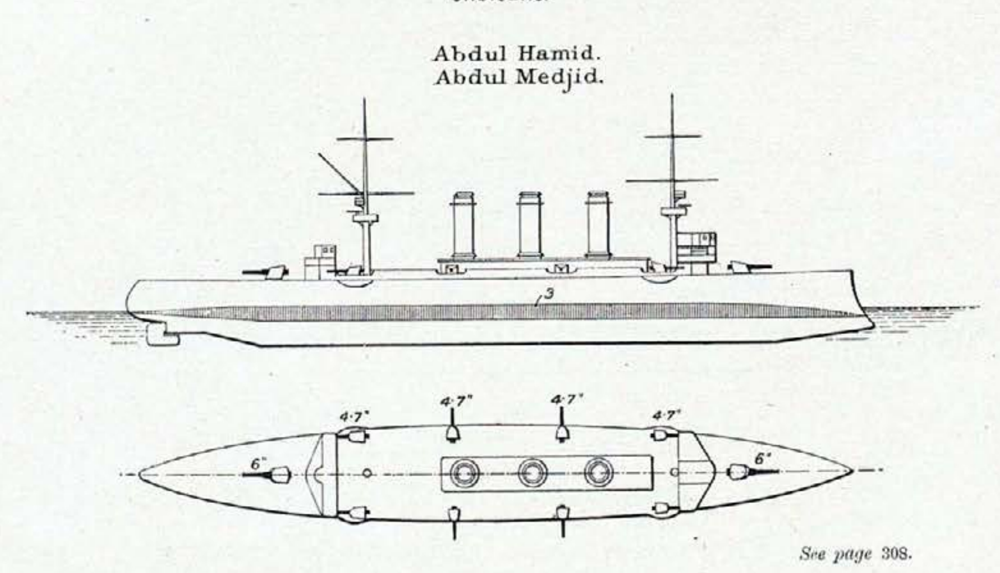
Messoudieh.



See page 307.

CRUISERS.

Abdul Hamid.
Abdul Medjid.

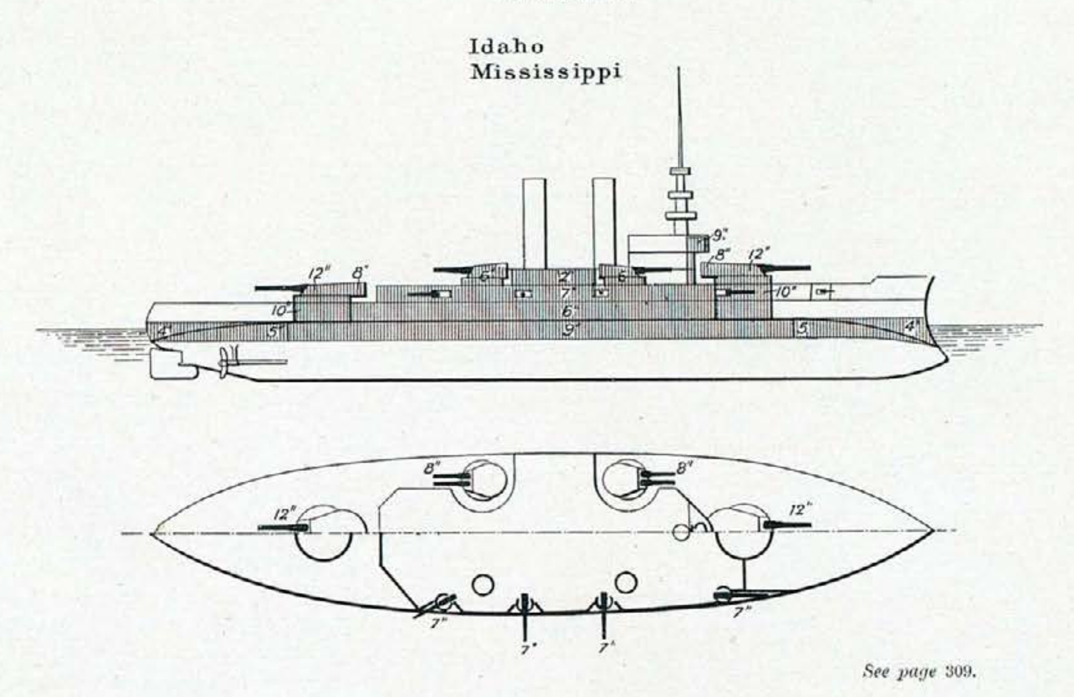


See page 308.

UNITED STATES.

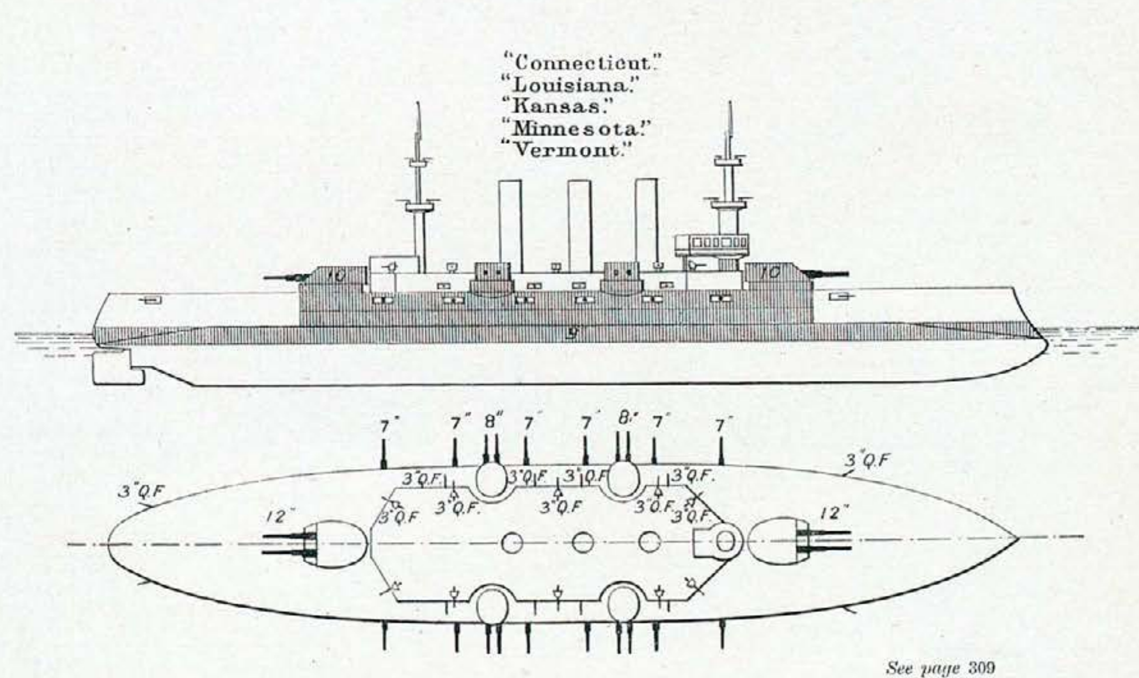
BATTLESHIPS.

Idaho
Mississippi



See page 309.

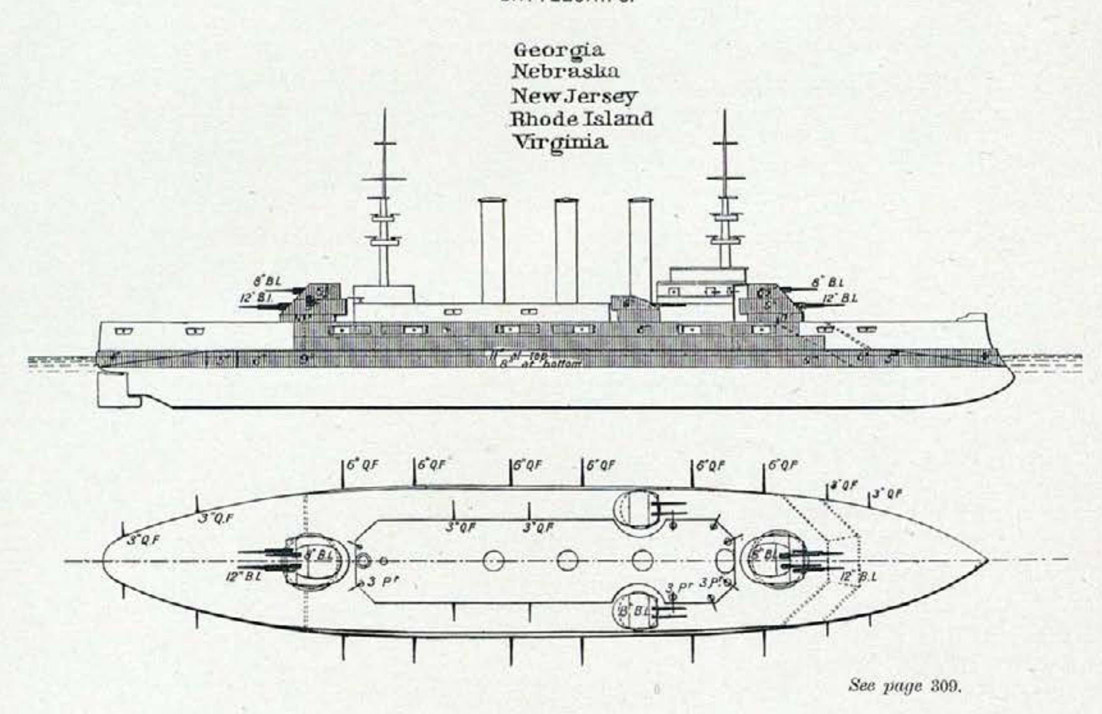
"Connecticut."
"Louisiana."
"Kansas."
"Minnesota."
"Vermont."



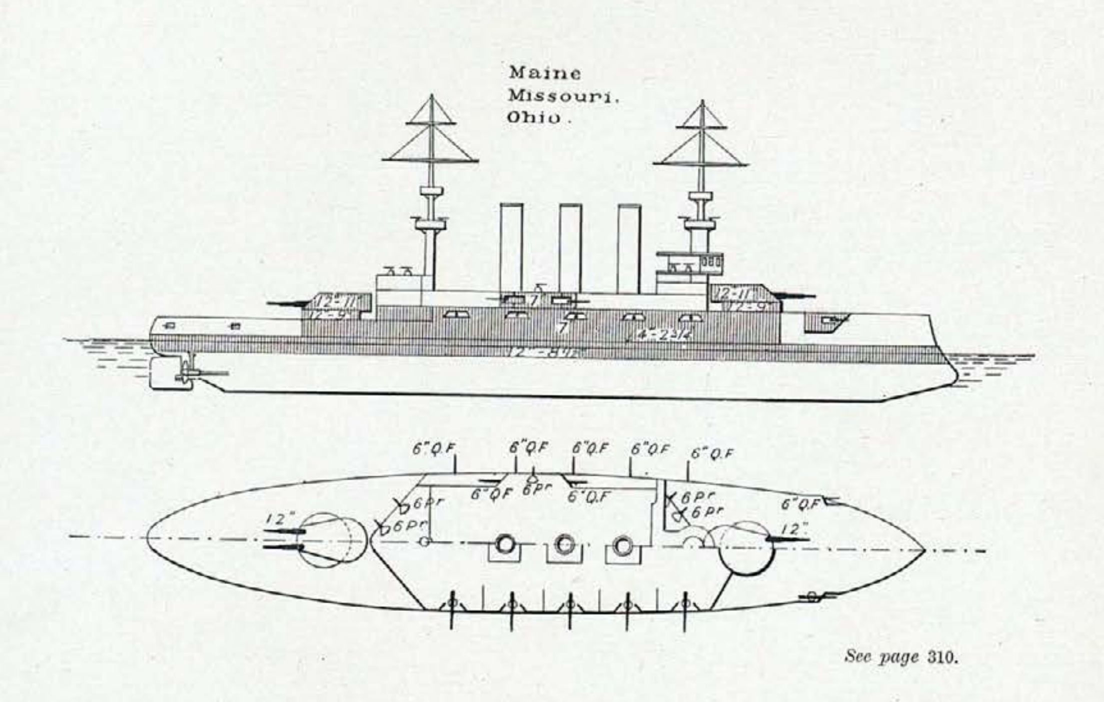
See page 309

UNITED STATES.

BATTLESHIPS.



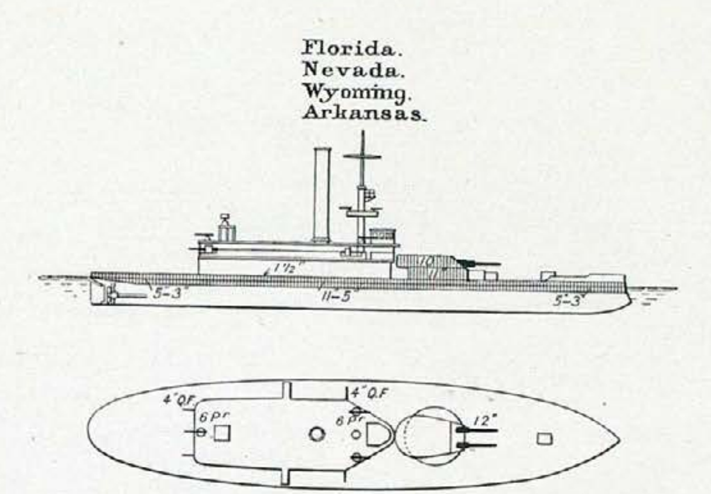
See page 309.

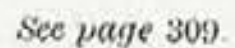


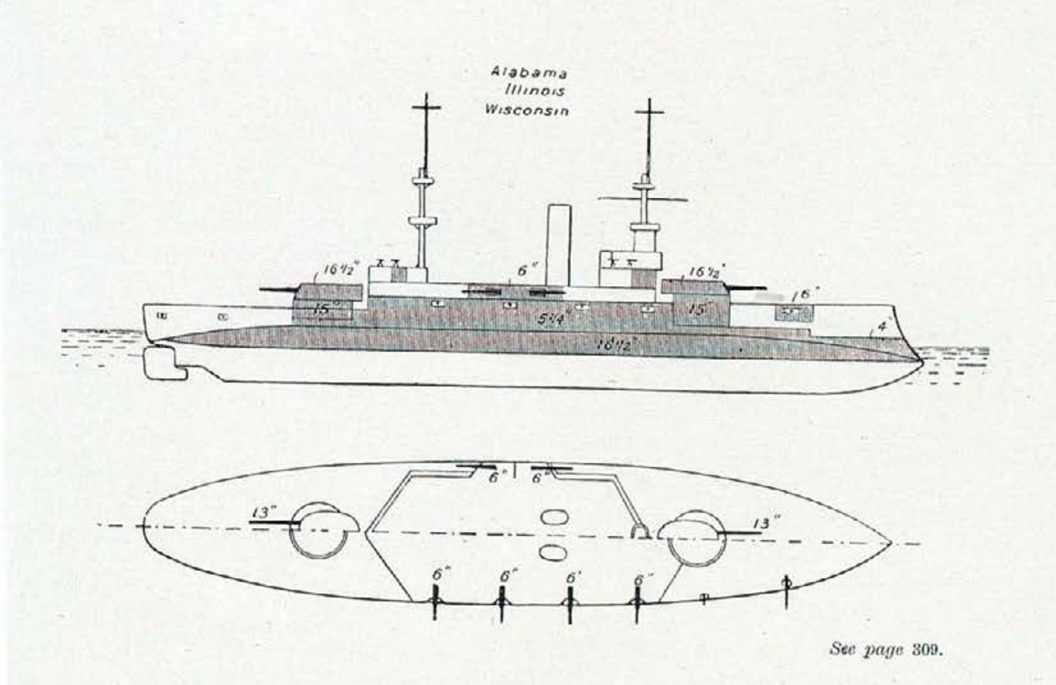
See page 310.

UNITED STATES.

BATTLESHIPS.



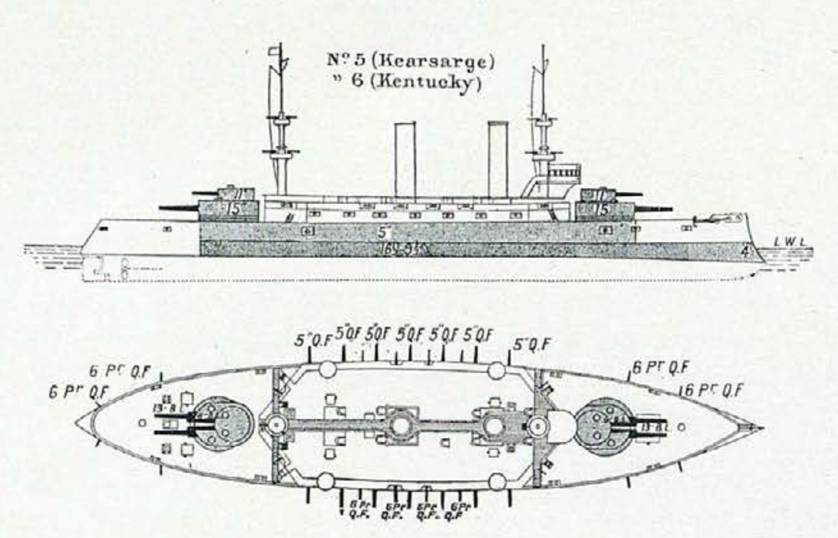

See page 309.



See page 309.

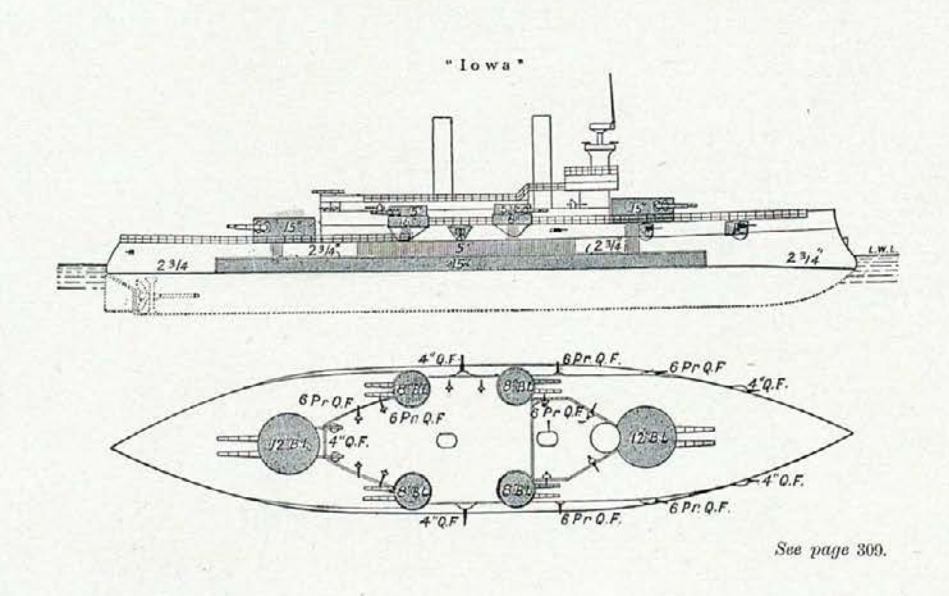
UNITED STATES.

BATTLESHIPS.



See page 310.

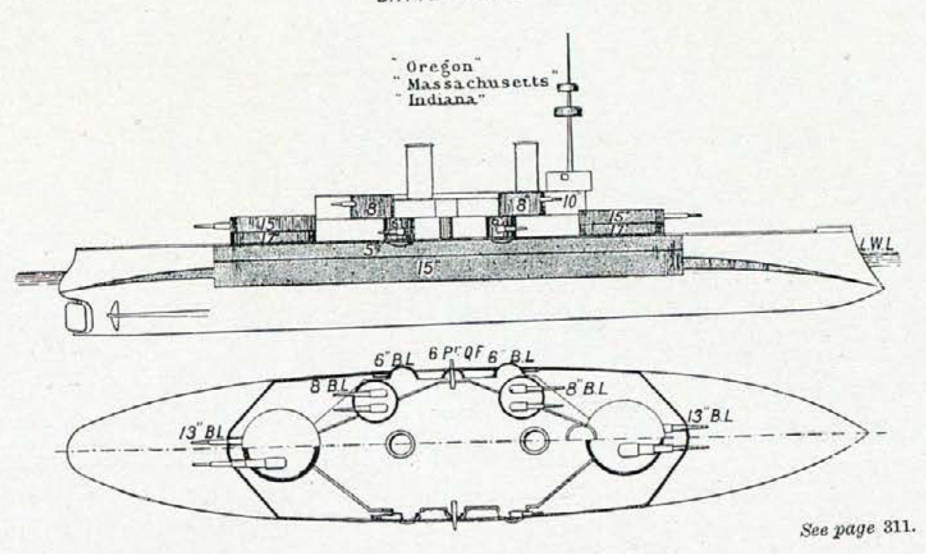
"Iowa"



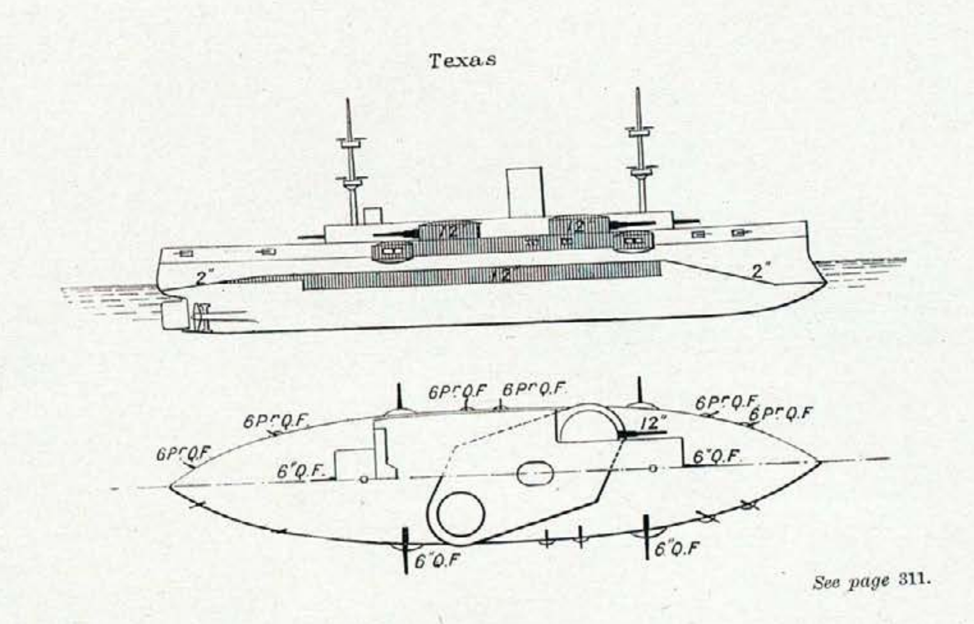
See page 309.

UNITED STATES.

BATTLESHIPS.



See page 311.



See page 311.

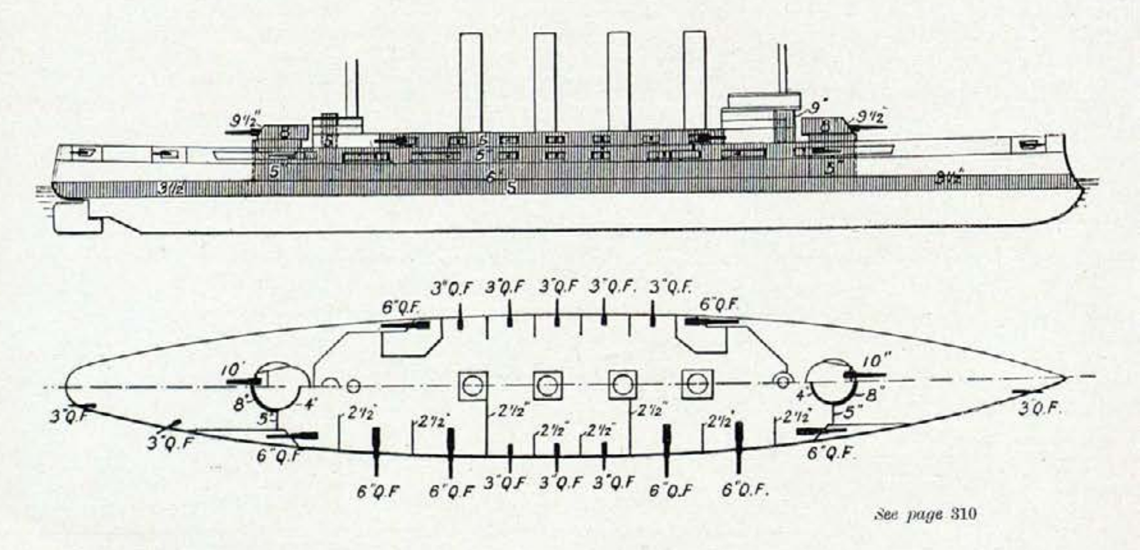
UNITED STATES.

ARMOURED CRUISERS.

California.
Pennsylvania.
West Virginia
Colorado
Maryland
South Dakota

See page 309.

Montana. **Washington.**
North Carolina. **Tennessee.**

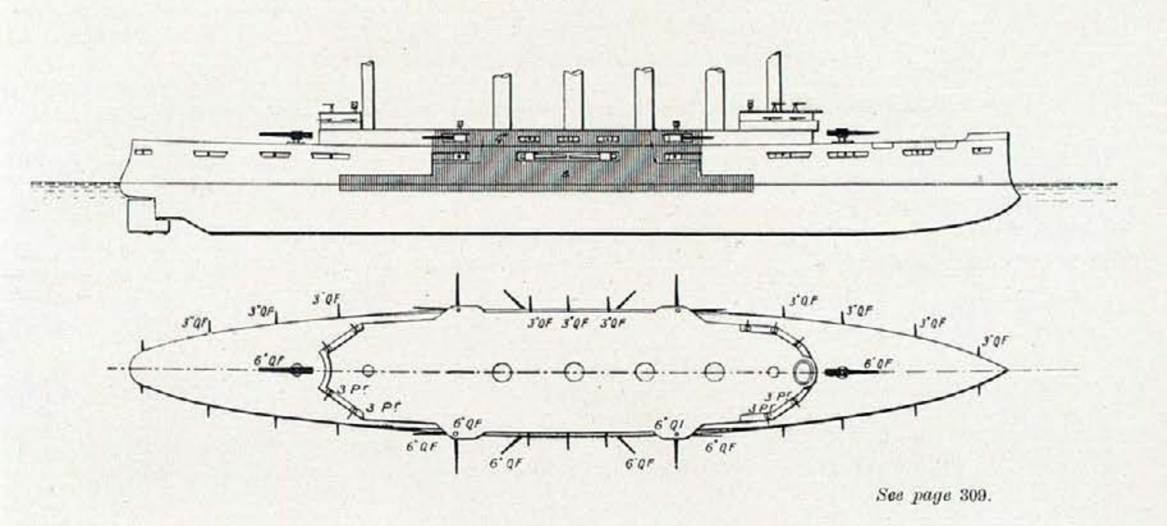


See page 310

UNITED STATES.

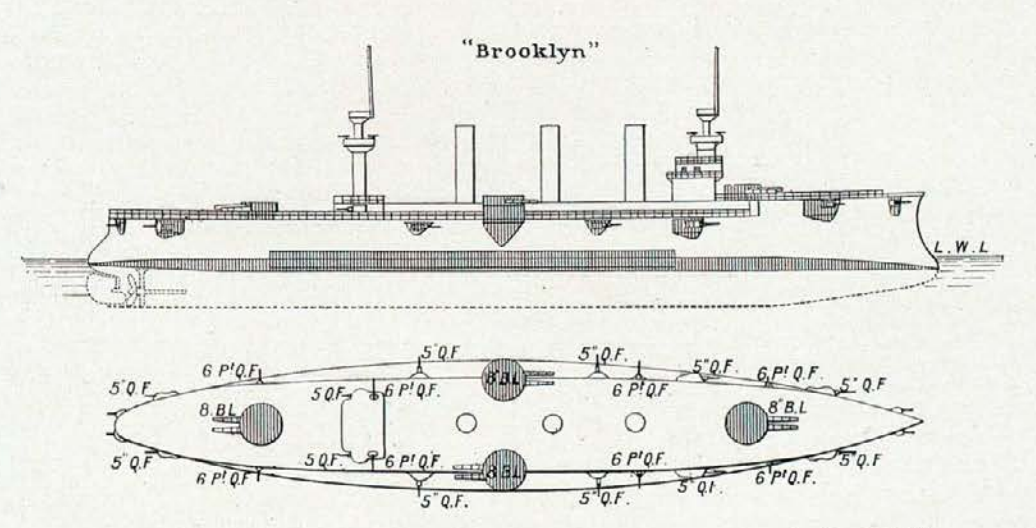
ARMOURED CRUISERS.

Charleston.
Milwaukee.
St. Louis



See page 309.

"Brooklyn"

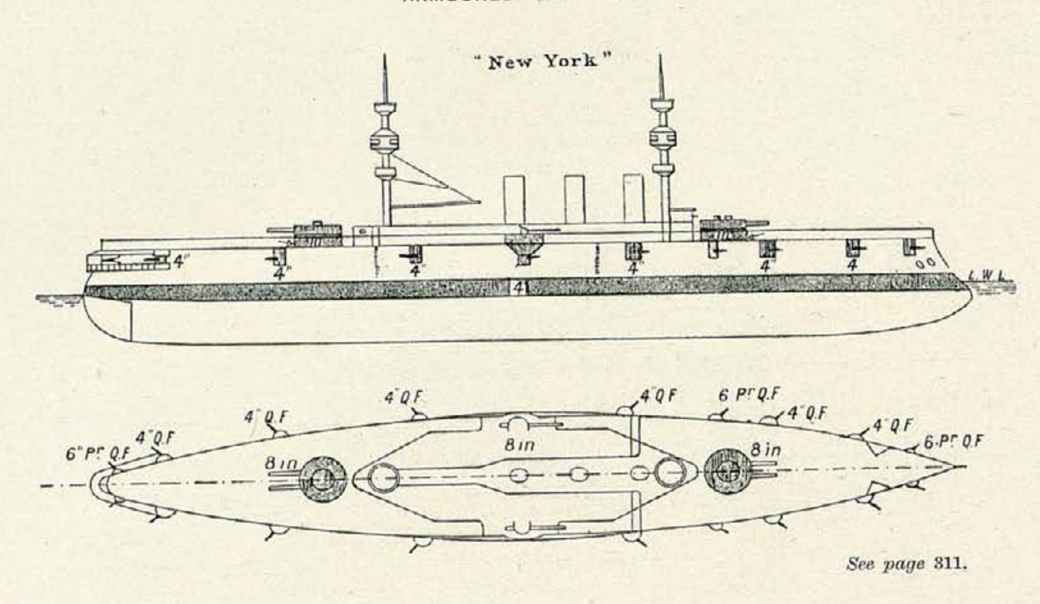


See page 309.

UNITED STATES.

ARMOURED CRUISER.

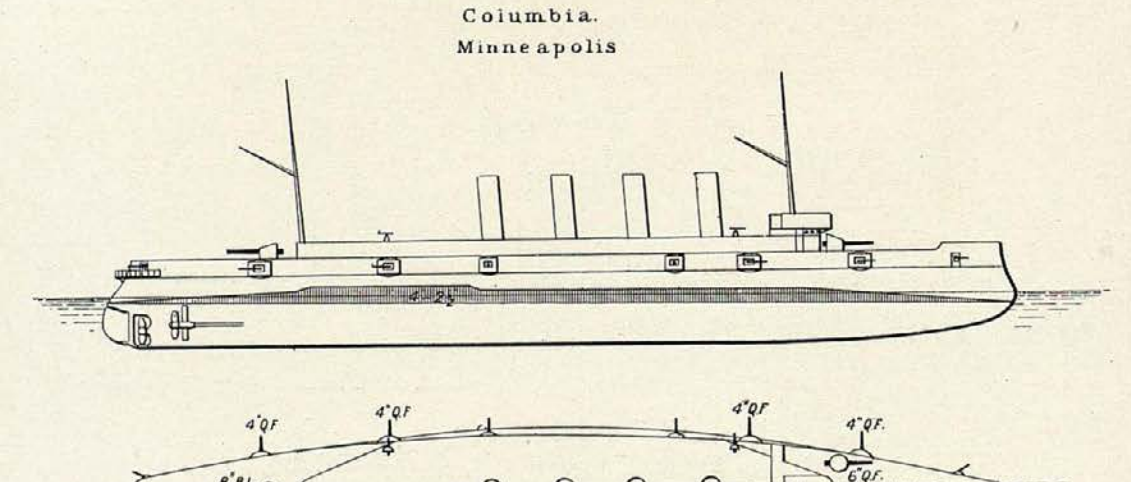
"New York"



See page 311.

CRUISERS.

Columbia.
Minneapolis



Note :- *Minneapolis has only two funnels.*

See page 312.

PART III.

ARMOUR AND ORDNANCE.

PART III.

CHAPTER I.

Armour.

To write an article exclusively dealing with the recent development of armour would be to make bricks without straw, since for the last eight or nine years practically no development, in thick armour at least, has taken place. A stage in progress was reached when the Krupp process of manufacture was introduced in 1895, and that process for all thicknesses to which it is adapted may still be considered to hold the field. It may be allowable, however, at the present moment, during this pause in development, to reconsider briefly, and from a fresh standpoint, some of the chief landmarks of the history of armour plates; for although the facts will not be new to the readers of the *Naval Annual*, the point of view of the present writer necessarily differs from that of his predecessors. From the commencement of publication up to the year 1900 inclusive, this subject was most ably handled by the late Captain Orde Browne, R.A., whose point of view was that of the independent artillerist with very exceptional opportunities of obtaining information; for although not altogether behind the scenes, either in the Service or the factory, he was more so as to the former than any manufacturer, and as to the latter than the average naval or military officer. At his lamented decease, the subject was taken over and no less ably dealt with by another expert, whose standpoint was altogether different—more fully behind the scenes as to the Service, but still less concerned with the production of the material treated of. Now the point of view is once more changed, and is that of one behind the scenes as to the factory alone, and seriously handicapped by the absence of that kind of information which only recent and intimate relations with the Service itself can afford. This year more than at any previous time specific facts for discussion are very hard to obtain, as the publication of particulars of Government trials is under prohibition, and manufacturers both of armour and projectiles evince a tendency to be more reticent than heretofore as to the results of their own private experiments.

Outcome of the old rivalry between compound and homogeneous steel plates.

If we turn to the *Naval Annual* of 1901 we find a clear and complete summary of armour plate progress from the days of the compound system up to the period of the introduction of the Krupp process, and are reminded that compound and all steel plates were for many years fierce rivals, dividing those interested in the subject into two opposing camps. It would appear at first sight, therefore, that as the plate of to-day is made entirely of steel the all-steel principle has emerged victorious from the conflict. But this is by no means the case. The modern plate, though not built up of separate parts in the old way, is essentially a compound plate nevertheless. The compound system is its basis; though modified and perfected by the substitution of a tough steel for wrought iron in the back, and by getting the combination of hard face with tough back without having to unite, more or less imperfectly, two separate plates. The underlying principle of all steel was homogeneity: a principle now surviving in the case of thin plates alone, and then chiefly on account of manufacturing difficulties, which quite recently are claimed to have been surmounted.

Relative resistance to uncapped shot of different classes of armour.

The increase of resisting power against uncapped projectiles, gained by the successive improvements in armour hitherto introduced, is well established, and may be recapitulated as follows:—The resistance to perforation by uncapped projectiles of 15 in. of wrought iron is about the same as that of 12 in. of simple steel or compound plate, or of $7\frac{1}{2}$ in. of Harveyed steel, or of $5\frac{3}{4}$ in. of Krupp steel. These are not hard and fast figures, as the proportional resistance of plates of different thicknesses vary somewhat, but they fairly represent average results. Great steps in advance are to be observed here, conferring substantial benefits on both the naval architect and the taxpayer; for where the former now provides, say, 3000 tons of armour for a battleship, he would have had in the wrought iron days to provide 7500 tons to get the same protection over the same area, and this would have occupied (taking an average thickness of 7 in. for the modern armour) some 20,500 cubic ft. more space. So the naval architect's gain in a single battleship may be put down at 4500 tons displacement and 20,500 cubic ft. of space available for other purposes. Similarly, if the taxpayer had to pay at the same rate per superficial unit of equal protection as in the days of compound armour, his present-day armour would cost him very considerably more than it actually does.

Irrational system of dealing in armour.

Now to pay by the superficial foot, or superficial yard, of area protected against a specified attack, would seem a most natural and satisfactory arrangement, and it is unfortunate perhaps, though easily intelligible, that the illogical system of buying armour by weight

came to be established, since it causes cost to vary directly as the most undesirable quality. To buy a flying machine by weight would seem almost equally reasonable. The system, however, is too well established to admit of easy alteration, and it has its conveniences besides; only it should be remembered that an apparent increase of price is bound, under this system, to accompany increased efficiency, and that the highest priced armour per ton may be, and generally is, the lowest priced per unit of superficial area protected, which is the important thing after all.

Elaborate methods and appliances of present day as compared with the past.

The benefit to the armour plate manufacturer himself of improvements in the material he produces is not so obvious. He is victimised by the armour plate inventor rather than benefited by him; and indeed, except to the individual firm that produces him, the armour plate inventor is the worst enemy the armour plate manufacturer has. He renders useless or obsolete, at a blow, many thousands of pounds worth of plant perhaps only recently installed; he compels the outlay of enormous sums for new plant; he extorts royalties in advance of manufacture; and he temporarily turns a staff of highly-trained men, in perfect working order, into a crowd of learners and beginners with entirely new experience to acquire. Furnaces quite suitable for heating wrought-iron plates, for any purpose, used to cost about £750, whereas a modern armour plate heating furnace is an elaborate and costly structure, costing from £4000 to £5000. In the old wrought iron days—even indeed in the period of compound armour—pyrometers were hardly ever used. It was quite sufficient with those simpler materials to guess the adequacy and uniformity of a heat by optical estimation, and a consideration of the time the furnace had been going, and the extent to which it had been urged. Now, pyrometric tests have to be simultaneously made at different parts of the furnace and carefully recorded at half-hourly intervals throughout the day and night. The heat manipulations used to be few and simple; now they are numerous and highly complicated. Approximately uniform heats used to be good enough; now absolutely uniform heats throughout the plates or (more difficult still of attainment) heats that are uniform at the same parts, and uniformly differentiated at different parts of the thickness, are indispensable. Slight inequalities of heating; a mistake of a few degrees in the temperature attained; an error of a few minutes in the duration of exposure in the furnace; a slight hitch causing delay in the transport of a hot plate from process to process—any one of these things means the difference between the success or failure of the operation, and may easily convert a previously satisfactory plate into a hopeless waster.

Progress in plant and processes.

Of course all the time that developments in the armour plate industry, involving increased refinement in the product, have been going on, improvements in methods and appliances for dealing with the increasing difficulties have had to keep pace to render those developments possible. The so-called hard face of the old compound plates was relatively soft compared with the tool steel of their time, and could be cut in planing machines, although the process was tedious; but from the time that the Harvey cemented and chilled plate was introduced no cutting with steel tools has been possible, once the final chilling process, which renders the face as hard as glass, has been applied. Edge grinding machines and electric annealers were designed to meet this difficulty, the former to correct edges without softening them, and the latter to draw the temper of the face locally along the line where a cut was desired to be made, or to soften a spot where a hole was to be drilled. The oxy-hydrogen blow-pipe flame has also been used with some success for the same purpose as the electric annealer. Very great improvements have been made also in tool steel within the last few years, but as regards work upon armour plates, it is principally in surfacing that the modern high speed steel gives an advantage, since it does not appear to hold its edge against the hard skin of a rolled plate better than the old kinds; and for ploughing off sides and ends, its cut—which would otherwise far exceed that of the old steel—is limited by its comparative fragility. In surfacing work, perhaps 7 to 1 may represent the increased efficiency of the modern tool steel over the best known a few years ago, and for ploughing the increased average efficiency may be put at 3 to 1, and for drilling at 2½ to 1. These figures, however, only apply to the time the tool is actually cutting, which, taking into account the time spent in "setting" the work, and the idle periods during reversal, etc., is little more than one-half of the whole time of machining, leaving the increased efficiencies as roughly 3½, 1½, and 1¼ respectively; but even this depends upon whether the existing machines can be adapted to the higher-cutting speeds, which is often not the case. Moreover, nearly all the machines of the armour plate manufacturer's costly planing plant have been designed, for the sake of rigidity, so that the tool remains stationary and the work traverses. It is easily to be understood then that the moving backwards and forwards at a high speed of a heavy table, which with the plate upon it may weigh fifty or sixty tons, entails great wear and tear and an enormous expenditure of power, only a small fraction of which is utilised at the cutting-point of the tool. Here again is an instance of how the progress of the inventor tends to render obsolete the plant of the manufac-

turer; for it is quite a different type of machine which must be substituted for those at present generally installed, if anything like the full advantage of modern high-speed tool-steel is to be reaped.

The most recent appliance for cutting armour plates at any stage of their manufacture is a revival of the old toothless saw, which has long been used and is still at work for other purposes at one or two places in this country. This machine consists of a disc of mild steel about 8 ft. in diameter and $\frac{3}{4}$ in. thick, slightly roughened at the edge and driven at a very high speed. It is used like a circular saw, the work being advanced against it mechanically, and the cut is made by the burning away of the material in contact with the disc owing to the high temperature caused by the friction. This machine makes a very clean and comparatively rapid cut, and is nearly unaffected by the hardness of the material opposed to it. It naturally absorbs a large amount of power—about 250 horse-power—but practically the only objection to its use beyond the displacement of existing plant involved seems to be the terrific noise it produces, and this makes its employment very difficult in cases where the shop it has to work in is not far removed from dwellings.

Terminology of ballistics.

Before proceeding further with the subject of this chapter it will be as well to explain clearly the exact meaning of the terms "Figure of Merit" and "Factor of Perforation" which will be constantly referred to.

"Figure of Merit" is the term that has been used for some years in this country to express the ratio between the thickness of W.I. (wrought iron) just perforable by a certain round and the thickness of the particular plate against which that round is fired. In that sense it is really the figure of merit of the round, not of the plate. It has also been used to mean the real or ultimate figure of merit of the plate itself, i.e., the number of times its own thickness of W.I. that would be required to give the same resistance; but the two things are only identical when the round in question exactly matches the plate. To remove any ambiguity that may thus occur, Major Wolley Dod, late R.A., of Hadfield's Steel Foundry Co., Ltd., has suggested an additional term to take the place of Figure of Merit, or F.M., when used in the first mentioned sense. This term is "Factor of Perforation," abbreviated to F.P., and is a useful contribution to the nomenclature of ballistics. The exact application of the terms F.M. and F.P. will be clear from the following definitions:—

Definitions.

Figure of Merit.	Factor of Perforation.
The F.M. of a plate against a given round is the ratio between the thickness of W.I. the round can just perforate and the thickness the plate must have to just accept perforation by the round.	The F.P. of a round against a given plate is the ratio between the thickness of W.I. the round can just perforate and the thickness of the given plate.

Example:—A projectile endowed with sufficient energy to just perforate 15 inches of W.I. is fired at a 6-in. plate; then $\frac{15}{6} = 2\cdot5$ is the F.P. of the round in any case, but is only the F.M. of the plate in the event of bare perforation occurring.

When we say a plate has an F.M. of 2·5 we mean its resistance to perforation is equal to that of W.I. two and a half times as thick under the conditions of the round in question; we also mean that it will undergo bare perforation by a round whose F.P. is 2·5; that it will not be perforated by a round whose F.P. is less than 2·5, and that it will be perforated without absorbing all the energy of the projectile by a round whose F.P. is more than 2·5. Therefore if a plate is easily perforated by a certain round it has not earned an F.M. as large as the F.P. of the round, and if it is not perforated it has earned an F.M. larger than the F.P. of the round. Only in the case of a round just effecting bare perforation do the F.M. and the F.P. become identical. Repeated tests of different classes of plates have enabled the F.M.'s of average samples of each class as against uncapped projectiles to be determined and put on record as in the Tables given further on.

Ballistic Charts. Hadfield's F.P. and K.C. diagrams.

Major Wolley Dod has also designed a chart or diagram called "Factor of Perforation" diagram, to do the work of a slide rule in solving ballistic problems. From this can be read off (1) The thickness of W.I. perforable according to Tresidder's formula for each nature of service projectile at from 1200 to 3000 f.s. striking velocity; (2) the thickness of hard plate perforable according to the F.M. attributed to it; and (3) the F.P. of any service projectile fired at any ordinary thickness of plate within the given limits of velocity (*a*) when striking normally, (*b*) at 20° from the normal, and (*c*) at 30° from the normal, assuming the perforating power to vary inversely as the cosine of the angle of impact. Problems dependent upon the ascertainment of these functions can naturally also be solved. This diagram is ingenious and useful for projectiles of standard calibres and weights. It is supplemented by another diagram emanating from Messrs. Hadfield, called K.C. diagram, for ascertaining directly the perforation of uncapped projectiles through Krupp cemented plates.

It is interesting to note that Krupp's formula for K. steel

$$t^2 = \frac{WV^2}{D} \times \log^{-1} \bar{7}\cdot6469$$

on which this latter diagram is based, is identical in all respects, except that of the numerical coefficient, with the early English formula by Fairbairn for perforation of W.I., which formula is:—

$$t^2 = \frac{WV^2}{D} \times \log^{-1} \bar{6}\cdot3439 \times K$$

where K varies slightly with the velocity, being ·9, when V is between 2050 and 2300 f.s. Therefore for the useful velocity of 2100 f.s. the two formulæ become:—

$$\text{Krupp's for Krupp steel } t^2 = \frac{WV^2}{D} \times \cdot 0000004435l$$

$$\text{Fairbairn's for W.I.} \quad t^2 = \frac{WV^2}{D} \times \cdot 00000198675$$

and the relation is:—

$$\frac{\text{Krupp's } t^2 \text{ for Krupp steel}}{\text{Fairbairn's } t^2 \text{ for W.I.}} = \frac{44351}{198675}$$

or, taking the square roots and reducing:—

$$\frac{\text{Thickness of K. steel perforable by Krupp's form}^a}{\text{Thickness of W.I. perforable by Fairbairn's form}^a} = \frac{1}{2 \cdot 1}$$

Uselessness of the multiplication of formulæ.

which means that for velocities in the neighbourhood of 2100 f.s. the result of Krupp's K.C. formula would be got by using Fairbairn's old formula for W.I. and an F.M. of 2·1. It would also be obtained for any velocity by using a more modern formula than Fairbairn's (long since discarded on account of its inaccuracy at high velocities, owing to V being involved to the second power instead of the third), and a suitable F.M.

Major Edwards, R.A., has pointed out that for projectiles having the not unusual relation of 0·46 between their weight and the cube of their diameter, this formula of Krupp's becomes $t = \frac{DV}{2214}$ or, roughly, $t = \frac{DV}{2200}$. This would be worth noting if it gave fairly reliable results, as it can easily be remembered in the form of a rough rule for K.C. armour, viz., thickness perforable (with uncapped shot) is equal to calibre multiplied into velocity, divided by 22, and two decimal places marked off.

It is, however, to be noted that this formula, assuming as it does that perforating power varies with the square of the velocity, is open to the same objection as Fairbairn's, and may be expected to be increasingly inaccurate as the velocity goes up. As a matter of fact it will be found that for the velocity of 2700 f.s. each and every nature of service projectile calls, according to this formula, for an F.M. of about 2·95 in the plate matching it. Such an F.M., especially in thick plates, is not in accordance with ordinary experience.

The two following tables are for perforation of Krupp steel normally attacked. They differ considerably and must be accepted, rejected, or modified according to their conformity with actual experience.

PERFORATION IN INCHES OF KRUPP STEEL BY UNCAPPED SERVICE A.P. PROJECTILES.

(Based on Krupp's formula $t^2 = \frac{WV^2}{D} \times \log^{-1} \bar{7}\cdot6469$.)

Projectile.	Striking Velocity.												
	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700
4·7-in. of 45 lbs.	3·12	3·35	3·55	3·77	3·95	4·18	4·35	4·58	4·80	5·00	5·20	5·40	5·63
6-in. of 100 lbs.	4·08	4·34	4·60	4·87	5·15	5·41	5·70	5·98	6·25	6·51	6·80	7·08	7·38
7·5-in. of 200 lbs. / 8-in. of 212 lbs.	5·10	5·43	5·80	6·12	6·48	6·82	7·18	7·51	7·86	8·20	8·55	8·89	9·23
9·2-in. of 380 lbs.	6·42	6·88	7·30	7·74	8·17	8·60	9·02	9·44	9·89	10·30	10·75	11·19	11·60
10-in. of 500 lbs.	7·11	7·59	8·05	8·51	8·98	9·44	9·92	10·40	10·88	11·34	11·80	12·28	12·75
12-in. of 714 lbs.	7·72	8·24	8·75	9·25	9·77	10·29	10·80	11·32	11·82	12·35	12·86	13·37	13·90
12-in. of 850 lbs.	8·44	9·00	9·54	10·11	10·68	11·24	11·79	12·34	12·90	13·47	14·02	14·58	15·15

PERFORATION IN INCHES OF KRUPP STEEL BY UNCAPPED SERVICE A.P. PROJECTILES.

(Based on Tresidder's formula and Table IV. page 363.)

Projectile.	Striking Velocity.												
	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700
4·7-in. of 45 lbs.	3·0	3·3	3·6	3·9	4·1	4·5	4·7	4·9	5·2	5·4	5·5	5·8	6·2
6-in. of 100 lbs.	3·9	4·3	4·6	5·0	5·3	5·5	5·7	5·9	6·4	6·9	7·4	7·9	8·6
7·5-in. of 200 lbs. / 8-in. of 212 lbs.	4·7	5·0	5·3	5·5	6·1	6·7	7·2	7·8	8·5	9·3	9·9	10·7	11·4
8-in. of 250 lbs.	5·1	5·4	5·7	6·0	6·6	7·2	7·8	8·5	9·3	10·0	10·8	11·6	12·4
9·2-in. of 380 lbs.	5·7	6·0	6·3	7·2	8·1	8·9	9·7	10·8	11·7	12·5	13·2	14·0	14·9
10-in. of 500 lbs.	5·9	6·5	7·3	8·2	9·1	10·2	11·2	12·0	12·9	13·7	14·6	15·5	16·4
12-in. of 714 lbs.	6·4	7·3	8·1	9·1	10·3	11·4	12·2	13·1	14·0	15·0	15·9	16·9	17·8
12-in. of 850 lbs.	7·1	8·2	9·1	10·5	11·5	12·4	13·3	14·3	15·3	16·3	17·4	18·4	19·5

The following table is tentative only pending fuller experience.

PERFORATION IN INCHES OF KRUPP STEEL BY CAPPED SERVICE A.P. PROJECTILES.

(Based on Tresidder's formula and Table VI., page 364, modified by consideration of relation between thickness of plate and calibre of projectile.)

Projectile.	Striking Velocity.												
	1500	1600	1700	1800	1900	2000	2100	2200	2300	2400	2500	2600	2700
4·7-in. of 45 lbs.	3·3	3·7	4·1	4·5	4·9	5·3	5·8	6·3	6·8	7·4	8·0	8·5	9·2
6-in. of 100 lbs.	4·3	4·8	5·3	5·9	6·4	7·0	7·6	8·3	9·0	9·7	10·5	11·3	12·1
7·5-in. of 200 lbs. / 8-in. of 212 lbs.	5·5	6·1	6·8	7·5	8·1	8·9	9·6	10·5	11·4	12·3	13·3	14·3	15·3
8-in. of 250 lbs.	5·9	6·6	7·3	8·1	8·8	9·6	10·5	11·4	12·4	13·4	14·4	15·5	16·5
9·2-in. of 380 lbs.	6·8	7·6	8·5	9·3	10·1	11·1	12·0	13·1	14·2	15·4	16·5	17·8	19·0
10-in. of 500 lbs.	7·5	8·4	9·3	10·2	11·1	12·1	13·2	14·4	15·6	16·8	18·2	19·5	21·0
12-in. of 714 lbs.	8·2	9·2	10·1	11·2	12·2	13·3	14·5	15·7	17·0	18·4	19·8	21·3	22·9
12-in. of 850 lbs.	9·0	10·0	11·0	12·2	13·2	14·5	15·7	17·1	18·6	20·0	21·6	23·2	24·9

From this last table it might be roughly deduced that capped projectiles of full service weight are good for 1 calibre of average quality K. steel at 1800 f.s. and for 2 calibres at 2650 f.s. Cases are not wanting of perforation of 1 calibre with considerably less

than 1800 f.s., but in view of variations in quality of plates the velocity named is considered nearer the average.

As regards a rule for deducing the perforating power of a projectile striking obliquely from that it possesses for normal impact, at present the available data are scarce. Treating the obliquely presented plate as one normally presented but thicker in inverse proportion to the cosine of the angle of obliquity is a method generally admitted to be without claim to scientific accuracy. It deals only with the increased distance the perforating projectile would have to traverse in the obstructing medium, supposing its course were in no degree deflected from the straight line. The same objection applies to (what is not quite the same thing) resolving the velocity into its components normal and parallel to the plate, and considering only the former and the plate normally presented to it. It is probable that the many considerations which render the result of normal attack only approximately determinable beforehand are both multiplied and magnified when the attack is oblique. If this is true when the question is only whether the plate can be perforated, it is likely to have more influence still when the question is whether the projectile can perforate unbroken. Formula for oblique impact.

Subject to these remarks the following formula is suggested as a general formula for oblique attack :—Giving the usual meanings to t, D, W, and v, let C represent the F.M. of the material for its oblique thickness against the given attack, and θ the number of degrees of obliquity from the normal, then

$$v = \cos\frac{\theta}{2}\sqrt[3]{\frac{C^2\, t^2\, D \times \log^{-1} 8 \cdot 8410}{W \cos^2\theta}}$$

This is not so formidable as it looks, since V, the perforating velocity for a similar plate of thickness $\frac{t}{\cos\theta}$ normally presented, can be found at once by slide rule and the relation is quite simple, namely:

$$v = V\cos\frac{\theta}{2}$$

It will be seen that v and V are the same when $\theta = 0°$ and both become infinite when $\theta = 90°$: that for all intermediate values of θ, v is less than V (the idea being that if the shot bites it is deflected into a shorter path through the plate than is represented by $\frac{t}{\cos\theta}$); and that when $\theta = 0°$ and C = 1 the formula dissolves into the Tresidder formula for normal attack of wrought iron.

On the Continent, instead of measuring the quality of a plate by the relation between the thickness of W.I. giving equal resistance and the thickness of the plate, it is measured by the relation, R, between the velocity required to pierce the plate and the velocity Continental co-efficient corresponding to F.P.

required to perforate an ordinary steel plate of the same thickness, as calculated by the formula of Commandant Jacob de Marre, viz.:—

$$e^{1 \cdot 4} = \frac{p\,v^2}{a^{1 \cdot 5}} \times \frac{1}{1530^2} \; *$$

Where e = thickness in decimètres of plate.
p = weight in kilos of projectile.
a = calibre in decimètres of projectile.
v = Striking velocity in mètres seconds.

On account of the fractional exponents of e and a, this formula is a little troublesome to work without a slide rule, but slide rules for ballistic problems are now so generally used that one seldom requires to work out a formula. It is unfortunately impossible to state any rule for directly converting R, the de Marre coefficient, into F.P. or F.M. Each must be separately determined.

Armour-plate slide rules.

The slide rules usually provided for working the de Marre formula have to be set in one way when the weight of projectile is between 25 and 800 kilos, in another way when it is below 25 kilos, in a third way when it is over 800 kilos, and in a fourth way for plates of less than 9 cm. thick. Then the velocity for perforating ordinary steel thus found has to be used as a divisor of the given velocity to determine the coefficient R, which is the thing required. The slide rules provided for working the English formula, on the other hand, only require a single setting for all conditions within their range, and from that setting the thing required, namely, the F.P. of the round, can be read off without any calculation at all. Moreover, these rules being made in pairs, one to metric and the other to British notation, afford the means of instantly comparing the severity of British and foreign trials. For instance, take such a question as this: "Which is the more severe trial, that of a 6-in. plate tested with a 6-in. shot of 100 lb. at 2050 f.s., or that of a 15 cm. plate tested with a 15 cm. shot of 45 kilos at 600 m.s.?" The pair of rules, with a single setting each, tell us the F.P. of the first-named round is 2·4 and of the other 2·3, so the first is the more severe. Or, again: "What velocity must be given to the 24 cm. shot of 170 kilos to give a 25 cm. plate the same severity of test as that of a 10-in. plate attacked with a 9·2-in. projectile of 380 lb. at 2000 f.s.?" By using the twin rules the velocity required is found at once to be 613 m.s. without any calculation, and with only one setting each of the rules.

Function of the hard face of armour.

As there still appear to be in existence differences of opinion as

* Although this formula appears to involve v to the second power that is only because it has been framed on the theory, believed to be erroneous, that v ought to be so involved. On the theory, which is thought more defensible, that e ought to be involved to the second power, the formula would be written:

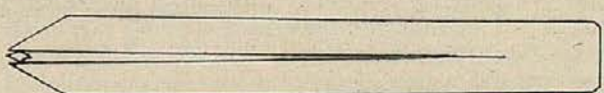
$$e^2 = \frac{p^{1 \cdot 4286}\, v^{2.8571}}{a^{2.1429}} \times \log^{-1} \overline{10} \cdot 9008$$

v then becoming involved to nearly the third power.

to how and why the cap confers so much advantage on the projectile in the attack of hard faced plates, the following observations may not be out of date or out of place. The hard face of an armour plate is designed to initiate the destruction of the delicate point of a projectile before the latter has obtained any appreciable penetration at all; for directly it has entered, as much as $\frac{1}{8}$ in. even, it obtains a side support which increases the difficulty of breaking it; and the further it goes in the less support it needs and the more it gets. It follows from this then (1) that the hard face has only a very minute fraction of a second of time in which to perform its main function; and (2) that anything which will enable the extreme point of the shot to hold together during this brief instant is likely to save the projectile from the fatal initial pulverisation and to defeat the main object of hardening the face of the plate. This is the whole *raison d'être* of a cap, and its *modus operandi* may be (as it has been) clearly shown by the following experiment, which should dispose of the theory often seriously advanced that the action of the cap is in the nature of that of a lubricant.

Experiment to demonstrate action of cap on projectile.

A chrome steel punch of the highest quality, say, 3 in. long and $\frac{3}{8}$ in. diameter, is held upright with its point on the hard face of a plate by means of a cylindrical guide in which it is free to move vertically, which guide holds it centrally at the bottom of a pipe or tube also standing on the plate. Down this pipe, and guided by it, a cylindrical weight can be allowed to fall, when released by a trigger or electro-magnet, from various heights. This simple apparatus enables a fair blow of previously determined energy to be delivered, and repeated as many times as necessary, on the punch in the direction of its axis. A heavy blow will shiver the punch to atoms; but, by suitably moderating the force, the splitting of the punch may be initiated without being completed, and punch after punch may be reduced to the condition indicated by the sketch, in which the original point is detached as a double-ended cone held by the body of the punch as a cherry stone might be held by the finger and thumb. The plate will not be indented.



Now if the point of the punch is not placed directly on the plate, but there is interposed a cap of soft steel, say, $\frac{1}{8}$ in. thick and about the size of a sixpence, with a conical indent nearly perforating it and fitting the point of the punch, the same blow may be repeatedly delivered without damaging the punch at all, yet causing it to indent the hard face every time as if it were a soft one. The explanation is that when two hard substances collide with more force than can be

supported within their elastic limits one of two things must happen: either one or both of them must break, or the harder must deform the softer. The point of a punch or of a projectile can always be made harder (owing to the greater rapidity with which the heat can be abstracted from it on chilling) than the face of a plate; so, given the former is properly hardened, it must indent the latter if it does not itself break. The apparently slight lateral support afforded by the cap prevents the point of a projectile from breaking in the excessively brief time available before it receives further and greater support by indenting the plate, and so it obtains penetration.

What happens to the shot point when the hard face does its duty.

When the hard face of a plate successfully performs its function and defeats the projectile by pulverising its point at the moment of first impact, a curious thing occurs. More or less of the front part of the shot strongly adheres to the plate, and, when detached, either by being jarred out by the concussion of subsequent rounds or otherwise, is found to be a solid lump of steel but of a shape widely different from the original form it possessed before the collision. How has this change of form been brought about? In scores of reports of armour-plate trials it will be found to be attributed to the heat of the collision having fused the shot metal, and not only altered its shape as by forging, but attached it to the plate as by welding. "Fused to the face of the plate," "welded to the face of the plate," are phrases commonly employed. What really happens has been explained in the *Engineer* as follows:—

It will be noticed that we have used the expression "consolidated dust lodged," instead of the more usual phrase "the point of shot remained fused in plate." The term "fused" as applied to a pulverised shot point is so commonly employed, and yet is so difficult to justify, that it may be worth while to point out our reasons for holding it to be altogether inapplicable. It is true that we have to account for a complete change of form in a piece of steel which we know is of a quality quite incapable of being forged, without crumbling to pieces, at anything below a red heat. The acceptance of a moulded form also, as in the case of the piece found moulded to the shape of the projectile core, seems to imply that the moulding took place when the fragment was in a plastic state, and so it is not difficult to understand how the idea of fusion suggested itself, and, for want of analytical examination, became currently accepted as explaining the facts. Now, what momentary temperature is set up on the collision of the shot with the plate no one can say, but however high it may be, the speed of heat conduction is very limited, and high temperature could hardly have more than a skin-deep effect in the brief instant available. To illustrate this, suppose a lump of steel of 4lb. or 5lb. weight were to be plunged into and withdrawn from a bath of molten steel with the greatest practicable speed; would it be fused? Certainly not; and yet it would have been exposed to an approximate temperature of 3000 deg. Fah. for perhaps 1000 times longer than the instant we have to deal with. Of the shot-metal that escapes sideways from the point of impact do we find traces of splashes as of molten spray? Never; but we find innumerable tiny marks as of fine shot or dust. Is not the lump of shot-steel imbedded in the plate commonly ornamented with the blue and straw tempering colours? Yet we know that a temperature of over about 600 deg. Fah. would infallibly obliterate these, and they do not recur on cooling. Is the heat of the embedded lump ever so great

when the range party examines it, that it is conceivable it was a liquid a minute or so previously? Every indication, on the other hand, points to the steel having undergone pulverisation and not fusion, and as all grains of the steel-powder that failed to escape laterally were under great pressure and *chemically clean*—there being no time for oxidation—during the period of the collision, it would follow that those grains would be found re-consolidated into a new solid lump, whose shape would be a replica of the contours of its environment at the moment the pressure ceased.

"Fused to the plate" is an even looser expression than "fused," since almost invariably the shot-lump has no attachment at all to the plate, but often drops out from the shock of further rounds, or may be detached entire by breaking the plate, say in a bending press. The reason for this is clear. The outer surfaces of shot and plate are not chemically clean, and the coating of oxide on them effectually prevents a general union of shot and plate metal. Occasionally, spots of fresh fractured steel of both projectile and plate find a contact during the collision period, and then the lump of shot steel remains attached at such spots to the plate, and requires to be prized off with a crowbar; but the more general case, as we have said, is that the lump drops out of the plate by itself, either during continuance of the firing trial, or when the plate is broken through the point of impact—an experiment that has been repeatedly carried out.

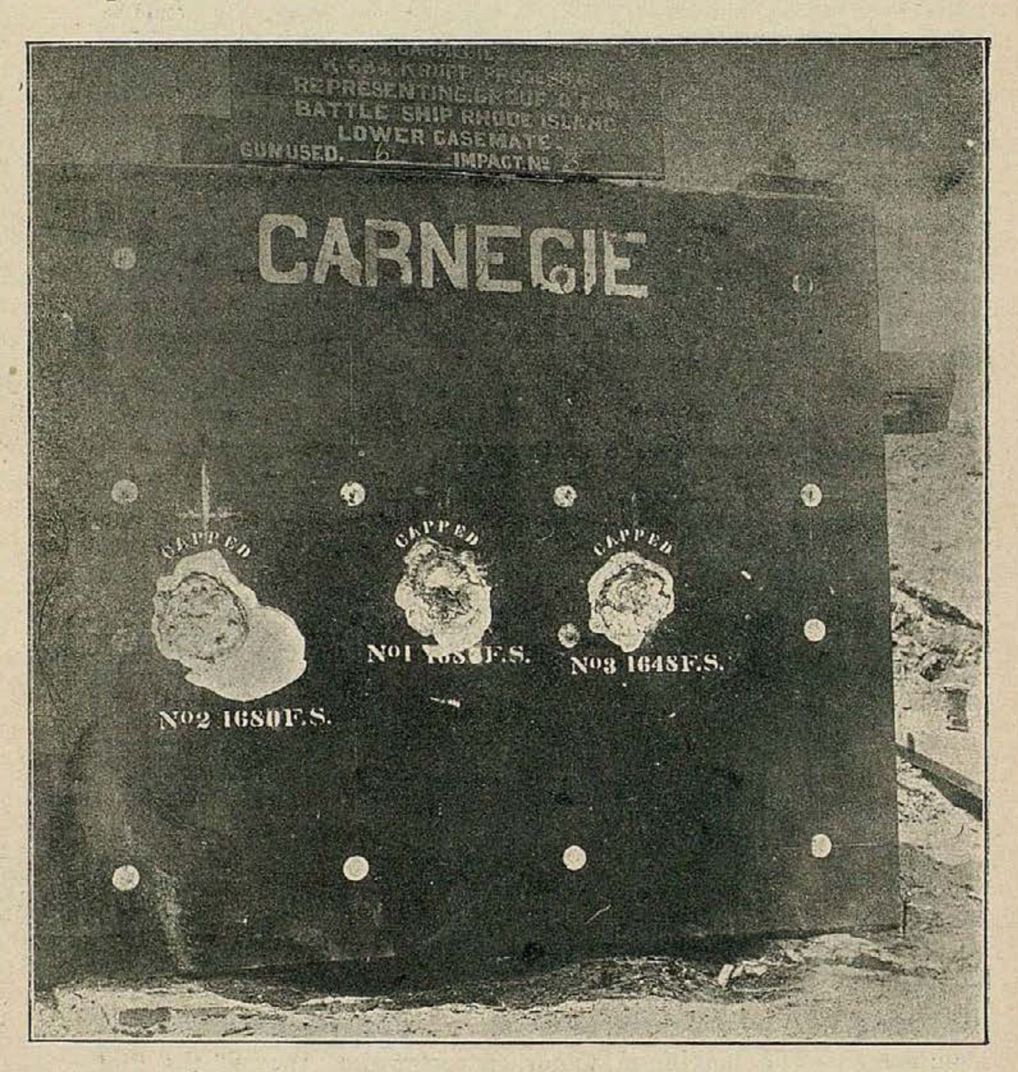
Effect of caps in practice.

No information is to hand as to the effect of caps in increasing the perforating power of common shell, but the effect on armour-piercing projectiles is to improve their powers of penetration into hard-faced plates from 15% to 30%, and although it is generally held, in this country at least, that they give no assistance at striking velocities below 1800 f.s., nor at highly oblique angles of impact, neither of these conclusions is absolutely established, nor is either concurred in by the experts of the United States. Further and exhaustive trials to settle beyond question this important point would seem to be desirable. If caps are impotent when the S.V. is below 1800 f.s. most of the American tests plates would have to be considered as proved with uncapped projectiles and then their velocities of attack would be very inadequate.

Trial of Carnegie 6-in. plate with 6-in. capped projectiles.

In the United States capped projectiles are the rule for the acceptance trials of armour plates, as will be seen from the accompanying reproduction of a photograph (kindly supplied among others by Colonel Millard Hunsiker) of the test of a 6-in. casemate plate for the United States battleship Rhode Island. The particulars of the trial are printed below the illustration, and give rise to the following comments:—The maximum factor of perforation, that of the first round, was 1·83. The approximate F.M. of a 6-in. Krupp plate attacked with capped projectiles is indicated in Table VI, page 364, as 2·0, so perforation was not to be expected. The attack appears to have been resisted with a large margin, the penetration achieved being only recorded as 1¾ in. The velocity necessary to give this round an F.P. of 2·0, and so render probable the perforation of the plate if the cap did its duty, would be about 1785 f.s., which again leaves a substantial margin over the actual velocity, though not apparently as great as the reserve of resistance of the plate. There is

not sufficient evidence to be obtained from this trial to demonstrate either the failure or the efficiency of the cap at a striking velocity under 1800 f.s., though the fact that the shells were wrecked tends to prove the former.



KRUPPIZED BALLISTIC PLATE K–684.

123 ins. × 97¼ ins. × 6 ins. Tested July 21, 1904, at Indian Head Proving Ground, to represent armour in Group "Q." Contracts, November, 1900, and February, 1903.

Gun used, 6-in. B.L.R.

	Impact No. 1.	Impact No. 2.	Impact No. 3.
Projectiles . .	Carpenter 6-in., capped, 105 lbs.	Carpenter 6-in., capped, 105 lbs.	Carpenter 6-in., capped, 105 lbs.
Striking velocity	1687 f.s.	1680 f.s.	1648 f.s.
Striking energy	2071 ft. tons.	2054 ft. tons.	1976 ft. tons.
Penetration . .	1¾ ins.	1¼ ins.	1¼ ins.

The Bethlehem Steel Company furnish most interesting particulars of trials of their Krupp process plates and capped projectiles from which the following are extracted:—

"The trial of an 11-in. to 9-in. Krupp process plate took place at Indian Head, April 3, 1904. The plate was 11 in. thick at the points of impact. Three rounds were fired normally with 10-in. Carpenter capped projectiles of 510 lb., with striking velocities of 1585, 1644, and 1610 f.s. respectively. The corresponding F.P.'s were 1·56, 1·64, and 1·59. The shells were all wrecked, and the greatest estimated penetration was 3¾ in. No cracks in the plate.

Trial of Bethlehem 11-in. plate with 10-in. capped shell.

"The trial of a $4\frac{9}{16}$-in. Krupp process plate at Redington took place on May 16, 1904. Four rounds were fired normally with 5-in. Midvale capped projectiles, weighing 55½ lb., 54¾ lb., 56 lb., and 53 lb., and with striking velocities of 1357, 1553, 1632, and 1740 f.s. respectively. The corresponding F.P.'s were 1·39, 1·69, 1·83, and 1·97. All the shells were again wrecked, and the penetration of the last round was measured 2½ in. No cracks in the plate."

Also of 4½-in. plate with 5-in. capped shell.

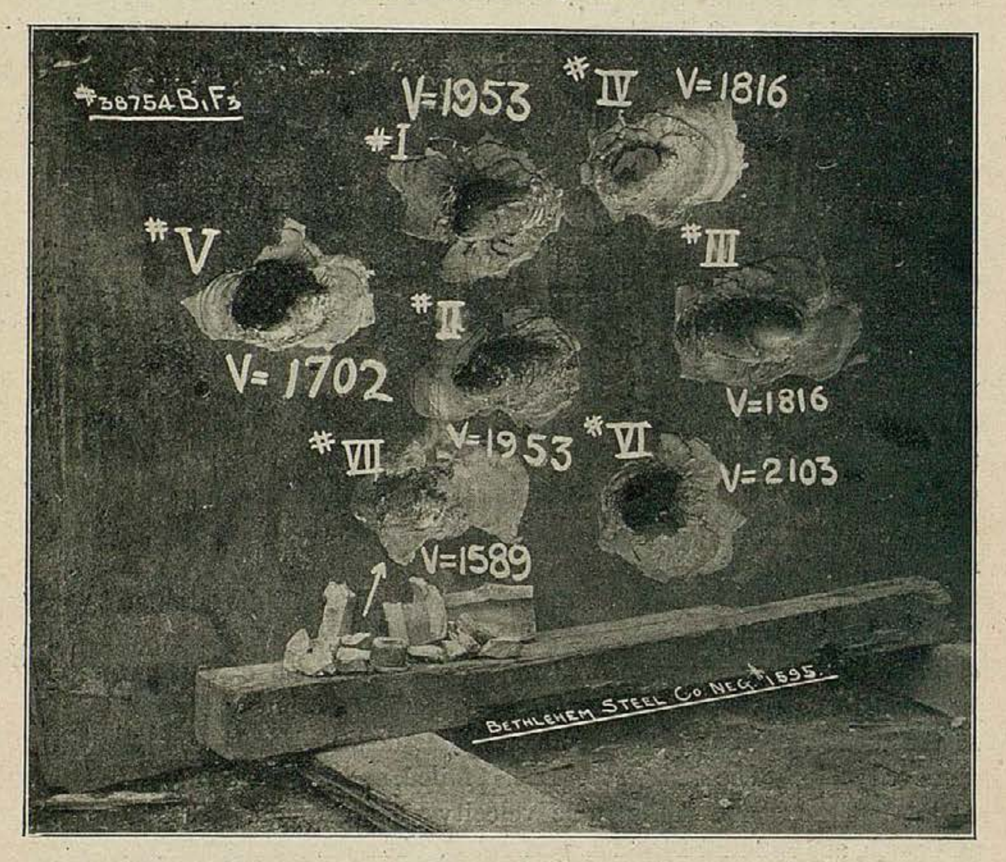
Here we have a case where the velocity was only slightly under 1800 f.s., where the perforating power, if the shell had held together, would have been enough, or nearly enough, to pierce the plate, and where the shell was wrecked as if uncapped. Either, then, the projectiles were inferior or the caps failed to protect them. So far this evidence tends to support the view that caps do not answer when the S.V. is below 1800 f.s. Compare the German trials a little further on, where the projectiles held together even though pulled up at a velocity of over 2200 f.s.

At the trial of a 4⅝-in. Krupp plate at Redington in March and April, 1904, the plate was presented at 45° of obliquity to the line of fire. Seven rounds were fired with 6-in. Bethlehem capped projectiles of 105 lb. The first, at 1953 f.s., perforated, but the second at the same velocity failed to bite, and was deflected, indenting the plate only 3 in. The third, at 1816 f.s., failed, and indented the plate 4¼ in., but the fourth at the same velocity went through. The fifth and sixth, at 1702 and 2103 f.s., perforated. The seventh, at 1587 f.s., failed, and only made an indent of 1½ in. All the projectiles were wrecked. This plate is illustrated. There were no cracks. It is difficult to deduce from this trial the matching velocity for the attack. In Round V. 1702 f.s. was enough to carry the projectile through, while in Round II., 1953 f.s. was insufficient. The plate, being 4⅝ in. thick normally at the point of impact, would measure 6·56 in. on the line of fire, and as against that thickness normally attacked the perforating velocity of a 6-in. capped shot of 105 lbs. would be 1900 f.s. The formula previously suggested would then give 1752 f.s. for perforation at 45° of the 4⅝-in. plate. A 6-in. uncapped shot at 1750 f.s. would barely perforate 4⅝-in. of average Krupp steel normally presented and would have less chance still against 4⅝ in.

Bethlehem oblique impact trial.

presented at 45°, so the utility of the cap at this extreme angle of impact appears to be demonstrated.

Bethlehem Steel Company.
So. Bethlehem, Pa., U.S.A.
4½" Krupp plate tested at 45° inclination with 6" capped A.P. projectiles.
Shots #I to #VII inclusive.
Plate, 100" × 72" × 4½" thick.



Lieut. Meigs, the ordnance engineer to the Bethlehem Company, states:—

"Experiments have been continued from time to time with firings at inclined armour set at 45° to the line of fire, with a view of studying the effectiveness of capped armour-piercing projectiles against it, and of their tendency to 'bite' or take hold at this angle. Out of some twenty large calibre capped projectiles, which were fired with striking velocities of 1750 f.s. and over, all except three perforated the respective plates at which they were fired. Of the projectiles which perforated the plates, all apparently turned in to an angle of about 15° from the normal before penetrating into the plate to any extent. All of the three projectiles which failed to perforate

the plates made the same form of indentation as is shown in rounds marked I and III on photograph C 1595" (reproduced).

As an instance of the practically complete immunity from cracking characteristic of the Krupp process, the Bethlehem Company furnish a photograph (not reproduced) of one of their plates (8 ft. 4 in. × 7 ft. × 6 in.) which has been perforated in no less than seventeen places by 6-in. capped projectiles without developing any cracks.

Bethlehem ribbed projectiles

On the ground that the danger from premature bursting of the projectile in the gun is less with a black powder bursting charge, the Bethlehem Company has introduced a projectile having a cavity sufficiently large to insure satisfactory disruption, and at the same time ample penetrative strength. A photograph (not reproduced) shows the results of a comparative test of a 4-in. capped projectile of this character, having a ribbed cavity and of a 4-in. capped projectile of ordinary form. Both were fired at a standard Harveyised 4-in. plate with a striking velocity of 1882 f.s., giving an F.M. of 2·22. The ribbed cavity projectile passed through the plate and was recovered whole, and the projectile of ordinary form was broken up in passing through the plate. Each projectile weighed 33 lb., and the volume of the ribbed cavity projectile was greater than that of the projectile of ordinary form. In order to ascertain whether the ribbed cavity projectile remained in a condition for effective bursting after passing through the plate it was loaded with 12½ oz. of black rifle powder and was burst. The projectile weighed, empty and without fuse, 31½ lb., and after bursting, 28½ lb. were recovered, consisting of 107 fragments.

Another photograph (not reproduced) shows a Bethlehem capped 6-in. ribbed cavity armour-piercing projectile after having passed through a standard 6-in. Krupp hard-faced plate with a striking velocity of 1897 f.s., the F.P. being 2·19. The projectile weighed, without cap, 101½ lb., and was recovered whole after passing through the plate. A similar projectile, weighing 101½ lb., was burst with black powder, and thirty-nine fragments were recovered, none weighing less than 1 lb. The volume of each of these 6-in. ribbed cavity projectiles was greater than that of the standard 6-in. armour-piercing projectile.

Blunt-headed projectiles.

Several experiments have been made to try the effect of flat or hemispherically-headed projectiles against hard-faced plates, but without important success. The drawback of the delicacy of an ogival point is of course absent, but so are its advantages; and as the former can be removed and the latter at the same time retained by the device of capping, there is no probability of any alteration

being made at present in the standard form. Round-headed projectiles are, however, used in Germany for the proof of deck-plates. Such projectiles have a minimum of perforating but a maximum of punching, smashing and racking power. They are the chief enemies to hard faces on very thin plates; so much so that the best 2-in. plates yet produced for resisting high-velocity perforating attack have shown (as will be seen from the particulars of the Meppen trials of Charpy plates given later on) actually less resistance to them than would be expected from ordinary "simple" steel plates.

Capped projectiles against unhardened plates.

Projectiles aimed in action at hard-faced plates may strike upon plates that are not hard-faced, and anything, such as the blunt heads referred to, that would tend to lessen their chance of perforation in that case is naturally undesirable. Caps, indeed, would be better absent when the face attacked is unhardened, but the obstruction to perforation they would then cause is probably too insignificant to be worth consideration. At the same time, now that caps are being generally adopted and there are plenty of plates with unhardened faces in existing navies, it would be well worth while, if it has not already been done, to fire a few rounds, with and without caps, at a plate of this class to see how far, if at all, the cap then detracts from perforating power.

Thin armour against common shell.

Two-inch armour may be made to keep out the 4-in. common shell of 25 lb., uncapped up to about 1700 f.s. striking velocity. It has, therefore, as against this projectile, the enormous figure of merit of 3·3, entirely due to the easy pulverisation of the weak shell on impact with its hard face, so that if this pulverisation could be prevented by a cap or otherwise, 1220 f.s. ought to carry it through, and its perforating power would be increased 65 per cent.

Methods of cap attachment.

Various methods have been devised for attaching caps to projectiles, but only one involving no cutting or grooving of the projectile's head. This method consisted in "sweating" a collar, by means of solder of low fusing point, on to the shoulder of the shell, which collar carried an external screw to receive the cap. Probably the strength of this attachment would have sufficed in ninety-nine cases out of a hundred, but so much stress is laid on the power of the connection to withstand abnormally rough usage that the plan named has been abandoned, and now all the devices in use involve some removal of material from the projectile itself.

Russian.

In the Russian method of attachment the nose of the shell is machined so as to leave an annular recess about one-sixteenth of an inch deep, dying away to nothing in a width of about half an inch. The cap is then forced on so as to get "hitched" by the shoulder of this recess, which acts something on the principle of the barb of a fish-hook.

Hadfield's method is to mill or grind recesses like thumb-prints round the nose of the shell, and into these the metal of the cap is hammered or pressed so that the cap can neither rotate nor come off. Johnson cuts or grinds an annular groove round the nose with one or two little notches to prevent rotation. The Firth-Sterling method is to make an annular groove in the nose of semicircular section and another in the inner surface of the cap, which latter is run out tangentially at two opposite points by holes through the metal of the cap. Into these holes two pieces of iron rod are inserted and driven till each piece fills half the circular groove and projects equally into shell and cap. Firth's plan is to have both in the nose of shell and interior of cap, which are tinned and sweated together with low fusing-point solder, three corresponding shallow annular grooves into which white metal is run. Judging by the success achieved all these methods appear to be practically satisfactory, and it must be taken as demonstrated that the grooving or otherwise indenting of the projectile's nose has no appreciable effect on its strength.

Hadfield. Johnson. Firth-Sterling. Firth.

A very great difference is observable in the shape of the caps adopted by this country and Russia respectively. Our caps are not unlike an ordinary thimble in outline, the angle at the apex being about 150°, while the Russian caps are ogival over their whole length, and it is understood that much importance is attached to the precise method of describing the curves of the sectional outline. Theoretically, the Russian shape is the best for the projectile's flight through the air, and the English for its impact with the armour, but the punch experiment alluded to a little earlier shows what very slight lateral strength the cap requires to do all that it has to do, so possibly a great part of the weight put into the broadening of the forepart of the English cap might be dispensed with or redistributed with advantage. If the Russian shape assists perforation as much as the English, both for normal and oblique attack, then it is to be preferred, for it would certainly tend to promote accuracy of flight and reduction of air resistance.

British and Russian caps compared.

That the relation between the calibre of capped shot and thickness of plate attacked has a decided effect upon the F.M. of the latter, is well illustrated by some photographs and particulars of capped shot proof in Germany, kindly furnished by Herr Ehrensberger, a Director of Krupp's Steel Works. A 300 mm. Krupp plate backed with oak was attacked with a 15 cm. capped projectile weighing 45·1 kilos at 850·5 mètres seconds. Here the F.P. was 1·95, and as the shot got through with considerable energy to spare, the F.M. of the plate must be put well below 1·95. It was possibly only 1·70, as in the next example but one.

Effect on F.M. of varying relation between thickness and calibre.

In the second example, a 250 mm. Krupp plate without backing was attacked with three 21 cm. capped projectiles, of weights respectively 124·8, 125·3, and 125·05 kilos, and striking velocities respectively 642·4, 632·9, and 632·4 mètres seconds. The F.P.'s of these rounds varied from 2·10 to 2·15. They all went through uninjured, suggesting about 1·9 as the F.M. of the plate. This is not very much less than that given in Table VI for a 10-in. plate, but the disparity between calibre of projectile 210 mm. and thickness of plate 250 mm. is not so marked as in the previous and following examples.

The third example is of great value, as the velocity was varied in a way which allowed the F.M. of the plate to become apparent. The photograph of plate and projectiles is reproduced. In this case a 250 mm. Krupp plate was attacked as follows :—

Round	V.—15 cm. of 45·1 kilos	at 701·7 m.s.	F.P. = 1·75.	Perforated.
,,	VI.—15 cm. of 45	,, 695·3 m.s.	F.P. = 1·72.	,,
,,	VII.—15 cm. of 45·15	,, 683·8 m.s.	F.P. = 1·69.	Rebounded.
,,	VIII.—15 cm. of 45	,, 680·3 m.s.	F.P. = 1·67.	Lodged.

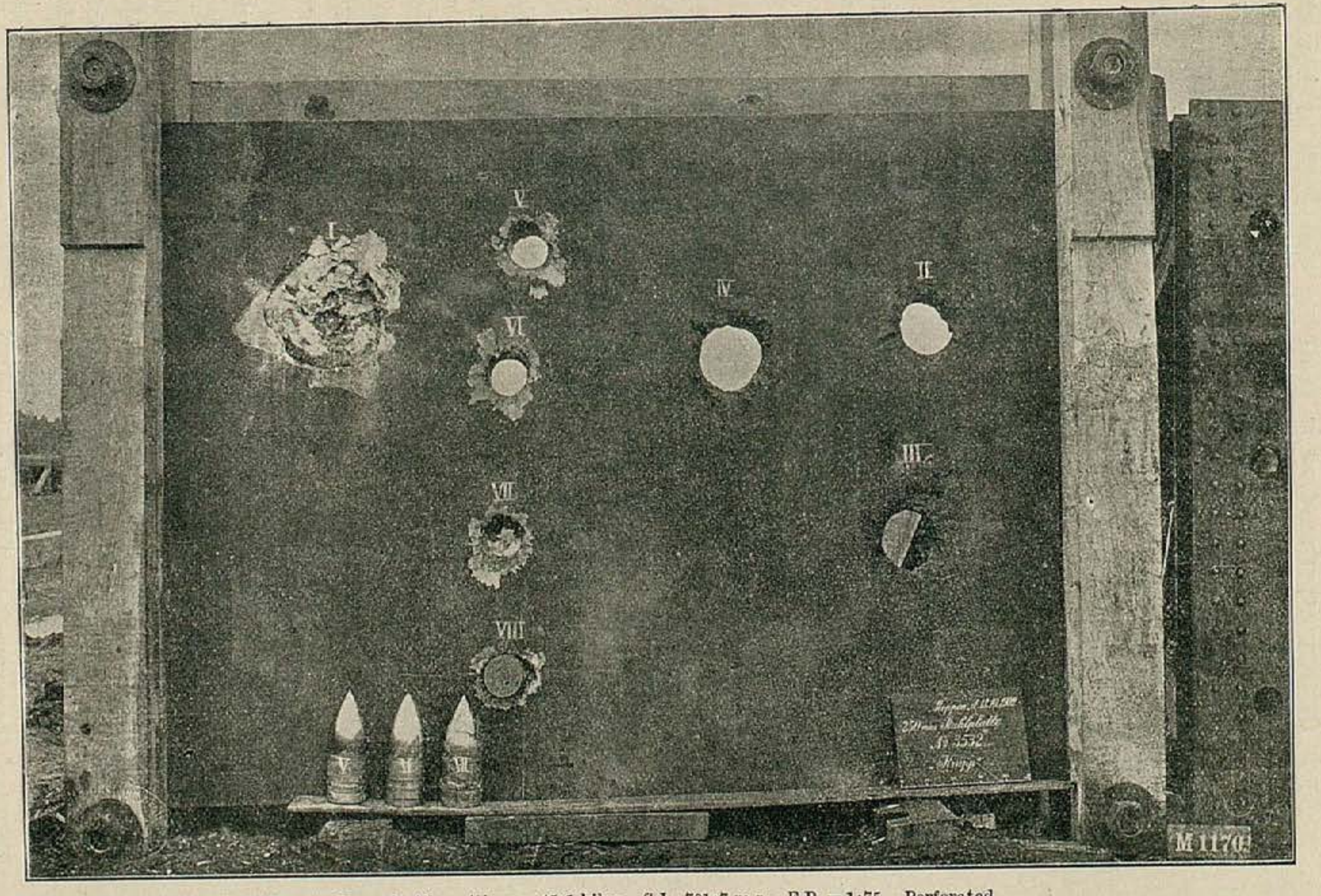
Here clearly the F.M. was between 1·69 and 1·72, and it cannot be far out to put it at 1·70, but as the plate was of early date it was probably a little inferior to the average of present manufacture, which would, it is thought, have an F.M. of about 1·8 against this attack.

The projectiles of this test would be hard to beat. To stand being rushed through a hard-faced plate at high velocity is an every day proof of excellence, but to hold together when suddenly arrested at 2230 f.s. is a good deal more than that.

Further illustration from British experiment.

A further illustration is afforded by the test, in May, 1902, of an 11·8-in. Vickers' K.C. plate with projectiles of considerably less calibre than the plate's thickness. The details of this trial, with views of the front and back of the plate, will be found in the *Naval Annual* for 1903, pp. 364–7, but the point about it that bears on the present argument is that an F.P. of 1·97 was more than enough for a 6-in. shot and less than enough for a 7·5-in. That the latter with an F.P. of 2·02 failed to perforate is, however, partly accounted for by its not holding together. The large, partly detached, disc at the back of this round is evidence that the projectile had lost its integrity as a boring tool and was exerting punching action. Compare the clean-bored holes of rounds I. and IV. The plate was undoubtedly above the average in resisting power, and the figure 1·8 will be found not far out for the F.M. of an average K.C. plate when the calibre of the attacking capped shot is only half its thickness,—

250 mm. Steel Plate with Hardened Face, No. 3532 Krupp.
Without backing.
Meppen, October 18, 1902.
Face.



Round V.—15 cm. Steel A.P. projectile, with cap,	45·1 kilos.	S.V. 701·7 m.s.	F.P. = 1·75.	Perforated.	
" VI. " "	45 "	" 695·3 "	" 1·72.	"	
" VII. " "	45·15 "	" 683·8 "	" 1·68.	Penetrated 380 mm. and rebounded.	
" VIII. " "	45 "	" 680·3 "	" 1·66.	" 385 mm. and lodged.	

always supposing the shot remains substantially intact, as a good shot may be expected to do if the cap acts efficiently.

Such limited experience as is available also tends to show that the F.M. of a plate against a given capped projectile of D in. calibre not only goes down as the thickness of the plate exceeds D, but also goes up as it gets less than D. The table of perforations of Krupp steel by capped projectiles at p. 344 is tentatively based upon an F.M. of 2 for $t = D$, going down to 1·8 for $t = 2$ D, and rising a little as t gets less than D.

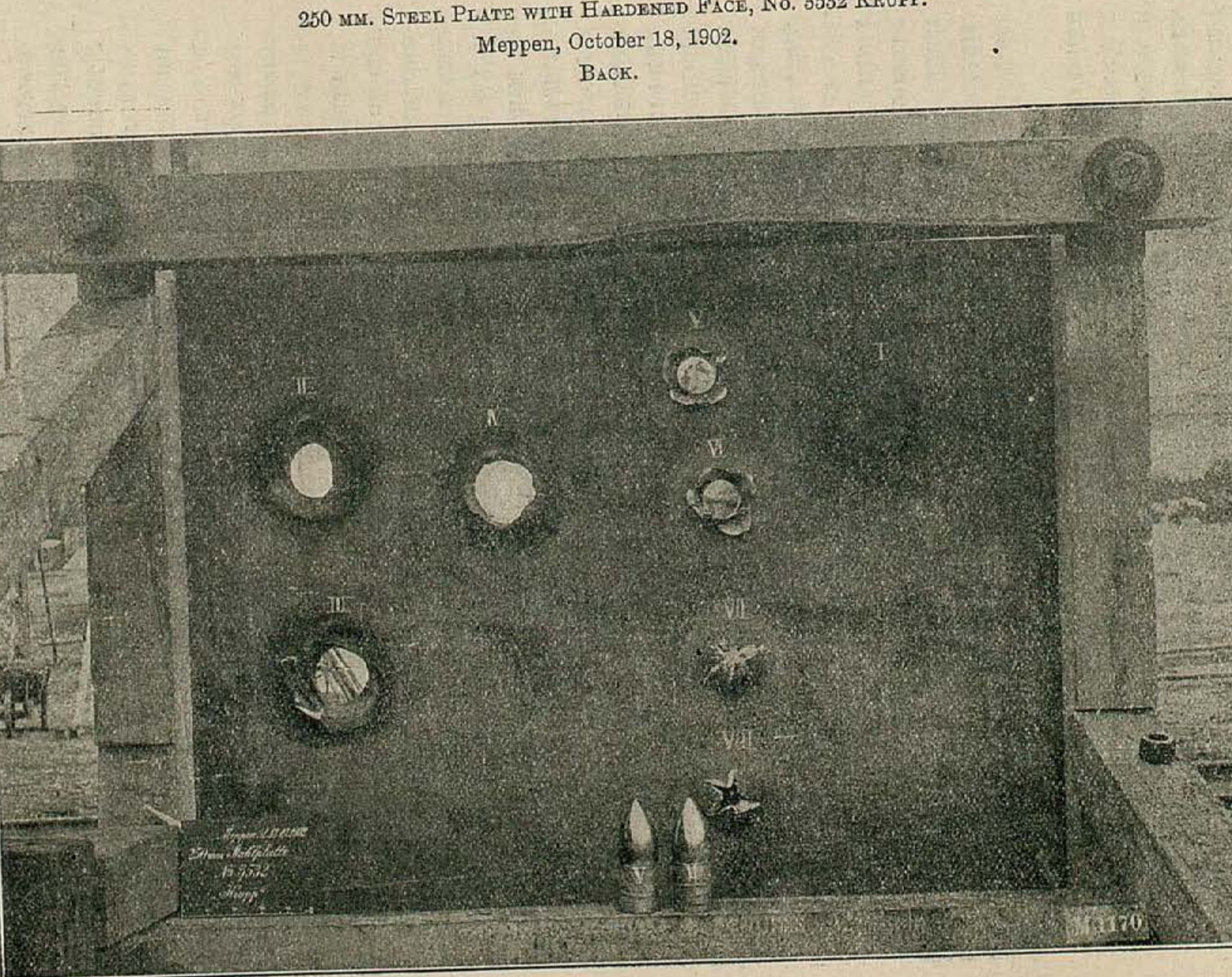
Do capped projectiles bore or punch their way through hard-faced plates?

As the hole made by a capped projectile in a K.C. plate, when the former is being proved, does not usually have the exfoliated bulge on the back that is common in the case of perforation by uncapped projectiles of non-face-hardened plates, the opinion is often held that the cap does not enable the projectile to drill or bore, but only to punch its way through. There are reasons, however, for suspecting this view to be ill-founded. When an uncapped projectile by sheer overpowering energy smashes its way through a hard-faced plate, it drives out a disc at the back—a complete disc like a frustrum of a cone, much larger in diameter on the rear side than the front and on the front side than the hole in the face of the plate. This is obviously a case of punching as distinguished from boring action, but the damage sustained by the plate is different to that inflicted by a capped projectile in perforating a hard-faced plate. This operates, it is believed, by true boring action, and not by punching, and the reason there is no ex-foliated bulge is that the excess velocity rips back the leaves of the bulge so quickly that it breaks them off. If this is true, then reduction of the velocity below that necessary for perforation should show the ex-foliated bulge in process of formation. This is exactly what happens, as will be seen by the illustration of the back of the Krupp plate. Rounds V and VI look as if the holes they left had been punched out, but that may be because the leaves of the bulges were broken away; and that these holes were bored out is demonstrated by rounds VII and VIII, where the ex-foliation characteristic of a bored perforation is clearly visible. When the velocity of a capped projectile greatly exceeds that necessary to just carry it through, the back bulge may be spread over such a large area that, being broken away, it leaves a hole so much the more resembling a punched hole. Rounds II, III, and IV at the same plate illustrate this, but it is suggested they were bored holes nevertheless.

Margin of extra velocity allowed to projectiles at proof.

When A.P. projectiles intended to carry a bursting charge are proved, they have to show their ability to get through the plate opposed to them without breaking, and must, of course, be given at

250 mm. Steel Plate with Hardened Face, No. 3532 Krupp.
Meppen, October 18, 1902.
Back.



least sufficient velocity to carry them through on the assumption that they are quite unbreakable. Presumably the merest trifle in excess of the bare velocity required for perforation would constitute the best proof, but, on the other hand, the merest trifle less than the bare velocity necessary would be fatal to success, as then the shell, however free from deformation, would fail by not getting through at all. So, as no one can predetermine the exact velocity necessary, a margin on the high side has to be allowed, and it is usual to make the F.P. about 0·3 more than the F.M.

British projectile improvements.

Among British manufacturers of projectiles, the Hadfield Steel Foundry Co., who have for long made a speciality of cast steel shells, have obtained in the past year some excellent results. Their "Heclon" 12-in. capped shell of 2½ per cent. bursting capacity (478 cubic in.) recently perforated a 12-in. K.C. plate, and passed through the whole butt, being recovered entire several hundred feet beyond. For a shell of this large calibre and made without forging, this result is exceptionally satisfactory. Taking into consideration the striking velocity, the F.P. was 2·36, and the F.M. of the plate 2·0, leaving a margin of 0·36. This projectile is one of six Hadfield "Heclon" projectiles which have all passed through K.C. plates and acquitted themselves well. Of the other five rounds the respective F.P.'s were 1·85, 1·88, 2·29, 2·48, and 2·48, and the F.M.'s, according to Table VI, would all have been 2·0 if the calibre of the attacking projectiles had been about the same as the thickness of the plate in each case. Under those conditions the first two rounds, having F.P.'s of less than 2·0, could not have got through their plates, but as a fact the projectiles of these two rounds were of substantially less calibre than the thickness of plate opposed to them, and the F.M.'s of the two plates concerned were in consequence, for that particular attack, less than the normal.

Other successful trials of large capacity A.P. shells.

Success in the manufacture of A.P. shell of high burster capacity is also reported from many other quarters. The Firth Sterling Steel Co., of Pittsburg, U.S.A., whose new type of shell was referred to as a great advance on previous practice in last year's *Naval Annual*, seem to have been pioneers in the successful combination of armour-piercing qualities with substantial capacity for bursting charge—properties which characterise the projectiles now adopted by the British Admiralty for calibres from 6 in. upwards. Messrs. T. Firth and Sons, of Sheffield, who are joint owners of the Firth Sterling Steel Co., have made a large proportion of the projectiles now in the British service, and furnish the following particulars of the acceptance trials of 14 cm. shell recently supplied to the Spanish Government. A 14 cm. gun not being available, the proof test was carried

out on some 12 cm. (4·7-in.) shell of the same manufacture and design, called "Firth's Rendable." Six rounds were fired at a 4½ K.C. plate with striking velocities varying from 1895 to 1929 f.s. giving F.P.'s varying from 2·28 to 2·35. The F.M. of a K.C. plate against capped projectiles being (Table VI) about 2·0, the difference, averaging 0·31, represents the allowance given to the projectiles to ensure complete perforation. This is a usual allowance at trials of this kind. All the projectiles passed completely through the plate and were recovered in perfect condition. The same was the case with a 7·5-in. A.P. capped projectile representing the manufacture of Messrs. Cammell, Laird and Co., which was fired through a 7-in. K.C. plate, the F.P. and F.M. being 2·48 and 2·0 respectively.

Probable future types of projectile.

There is every reason to believe that the types of projectiles destined for most general use in the near future will be, as was anticipated in last year's *Naval Annual*, nose-fused high explosive shell and base-fused armour-piercing shell of large internal capacity.

The rivalry between guns and armour.

The ascendancy of guns over armour, which was recorded as lost in the *Naval Annual* of 1901, would undoubtedly have been restored by the introduction of caps alone; but since that period improvements in guns and explosives have endowed the projectile with considerably increased muzzle velocity, so that while gun power against armour has advanced by two independent steps, either of which would have given it superiority over the defence, the two combined put the plate in the second place to such a substantial degree that it is worth considering whether the thickness of armour, which was reduced in consequence of the introduction of the Harvey and Krupp systems, should not be again augmented to render the defence at least as formidable as it used to be.

Heavy defence of to-day compared with that of twenty years ago. Belt.

British battleships launched up to about the year 1892 carried a maximum belt thickness of 18 in. of compound armour, equal to 22½ in. W.I., and this goes back at least as far as the Collingwood, launched in 1882. In ships launched from 1893 to 1898, 9 in. of Harvey steel, equal to 18 in. W.I., was substituted, and from 1898 forward this gave place to 9 in. of Krupp steel, equal to 22 in. of W.I. If, then, the perforating power of artillery had remained unaltered during the whole time, the belt armour of recent years, weakened during the Harvey period, would have nearly recovered with Krupp steel the same defensive power as was judged necessary more than twenty years ago. But the science of artillery has not stood still, and the belt armour of the King Edward VII would be easily pierced under parallel conditions to those against which the Collingwood's belt would have been proof. To go into particulars, the Collingwood's 18 in. of compound belt armour

could have stood up to the 12-in. gun of its time at any range greater than that at which the said gun was a match for 22½ in. of W.I.; but now improved velocities have increased that perforating power about 18 per cent., say up to 26½ in. of W.I.; and caps on the projectile have further increased it another 15 per cent. at a very low estimate, bringing it up to 30½ in. W.I. In other words, the King Edward VII ought to have a belt of at least 13 in. instead of 9 in. of Krupp steel to keep the same relative power of defence against attack as was possessed by belts of ships of more than twenty years ago.

This case for increased thickness of armour is really very much understated, for besides putting the assistance to the gun due to the cap at a very low figure, no account is taken of the fact that when the Collingwood was designed, and up to four years after she was launched, armour-piercing projectiles were made of Palliser chilled cast-iron, and when chrome-steel projectiles came in, about the year 1886, the piercing power of guns was estimated to have thereby been increased fully 20 per cent. So while, for the purpose of this argument, the Collingwood's defence has been taken at 22½ in. W.I. as against chrome-steel projectiles, it might justly have been taken at 27 in. as against Palliser projectiles; which would proportionately have emphasised either the excessive defence of the past or the inadequate defence of to-day. Foreign countries have not followed British practice in this attenuation of belt defence, as will be seen from the tables given a little further on.

Bulkheads and heavy gun positions.

As regards bulkheads and armour for heavy gun positions the necessity of increased protection to contend against increased gun-power has received partial recognition. The Collingwood was provided with 16-in. compound bulkheads, while the King Edward VII carries 12 in. Krupp steel. The former, as against old guns and Palliser projectiles, was equal to 24 in. W.I. Add the minimum extra allowances, viz., 18 per cent. for modern velocity and a further 15 per cent. for capped projectiles, and the result would require for the King Edward VII a bulkhead equal to 32½ in. W.I., or, say, 2 in. of Krupp steel more than she actually carries. So up to some four years after her launch the Collingwood, now weeded out of the Service, had heavier proportional protection, even for her bulkheads, than the King Edward VII had at the time she was laid down. One would think that the reverse ought to have been the case to allow for probable further improvements in artillery in the near future. The armour put on a ship will probably remain unchanged during its Service lifetime, but the guns it will have to withstand are likely to increase in power during the same period.

As it is necessary in comparing the resisting power of different kinds of armour to reduce them all to some common denomination, the following tables will be found useful. They make no claim to absolute accuracy, but may be taken as fairly representing the average results of experience up to the present. Comparison of British and Foreign heavy armour.

TABLES FOR CONVERTING VARIOUS THICKNESSES AND QUALITIES OF ARMOUR INTO THEIR ESTIMATED EQUIVALENTS OF W.I. FOR COMPARISON.

TABLE I.—COMPOUND ARMOUR ATTACKED WITH PALLISER PROJECTILES.

(Figure of Merit 1·0 previous to 1880.)

F.M. rose to 1·50 by plate improvements 1880 to 1886.

Thickness of Armour in inches . . .	6	7	8	9	10	11	12	13	14	15	16	17	18
Equivalent in inches of W.I.	9	10½	12	13½	15	16½	18	19½	21	22½	24	25½	27

TABLE II.—COMPOUND OR SIMPLE STEEL ATTACKED WITH FORGED STEEL PROJECTILES.

F.M. fell to 1·25 by projectile improvements 1886 to 1892.

Thickness of Armour in inches . . .	6	7	8	9	10	11	12	13	14	15	16	17	18
Equivalent in inches of W.I.	7½	8¾	10	11¼	12½	12¾	15	16¼	17½	18¾	20	21¼	22½

TABLE III.—HARVEYED STEEL ATTACKED WITH UNCAPPED PROJECTILES.

F.M. rose to from 1·8 to 2·2 by plate improvements 1892 to 1898.

Thickness of Armour in inches . . .	4	5	6	7	8	9	10	11	12	13	14	15	16
Equivalent in inches of W.I.	7¼	9½	13¼	14¾	16	18	19	20	21½	23½	25	27	29
Approximate F.M. .	1·8	1·9	2·2	2·1	2·0	2·0	1·9	1·8	1·8	1·8	1·8	1·8	1·8

TABLE IV.—KRUPP STEEL ATTACKED WITH UNCAPPED PROJECTILES.

F.M. rose to from 2·3 to 2·7 by plate improvements 1898 to date.

Thickness of Armour in inches . . .	4	5	6	7	8	9	10	11	12	13	14	15	16
Equivalent in inches of W.I.	9¼	12	16	18	20	22	23½	25½	27½	30	32¼	34½	36¾
Approximate F.M. .	2·3	2·4	2·7	2·6	2·5	2·45	2·35	2·3	2·3	2·3	2·3	2·3	2·3

THE USE OF CAPS ON THE PROJECTILES AFFECTS THE ABOVE GIVEN EQUIVALENTS ADVERSELY TO AN EXTENT APPROXIMATELY AS UNDER :—

TABLE V.—HARVEYED STEEL ABOUT 1 CALIBRE THICK ATTACKED WITH CAPPED PROJECTILES.

F.M. about 1·5.

Thickness of Armour in inches . . .	4	5	6	7	8	9	10	11	12	13	14	15	16
Equivalent in inches of W.I.	6	7½	9	10½	12	13½	15	16½	18	19½	21	22½	24

TABLE VI.—KRUPP STEEL ABOUT 1 CALIBRE THICK ATTACKED WITH CAPPED PROJECTILES.

F.M. about 1·9 to 2·0.

Thickness of Armour in inches . . .	4	5	6	7	8	9	10	11	12	13	14	15	16
Equivalent in inches of W.I.	7½	10	12	14	16	18	20	22	24	25½	27	28½	30

N.B.—When the calibre of the attacking projectile is much less than the thickness of the plate attacked, the F.M. is substantially less than indicated in these Tables, and *vice versâ*.

Making use of the foregoing tables for uncapped projectiles the following table has been compiled of the equivalents in W.I. of the maximum thickness of heavy armour carried by the principal battleships launched since 1895.

Year of Launching.	Battleships.			Maximum thickness of Armour expressed in inches W.I.		
	Nationality.	Class and Number.		Belt.	Bulk-head.	Heavy gun positions.
1896	British	Cæsar	3	18	25	25
	French	Bouvet	1	28½	...	26
		Gaulois	2	28½	...	28½
	German	K. Friedrich III . .	1	21	...	18¾
	Japanese	Fuji	2	32	...	25
	Russian	Rostislav	1	28½	9½	28½
	U.S.A.	Iowa	1	25	21½	27
1897	British	Canopus	1	13¼	21½	21½
	German	K. Wilhelm II . .	1	21	...	18¾
	Italian	Emanuele Filiberto .	2	18¾	13¼	18¾
1898	British	Albion	3	13¼	21½	21½
		Formidable	1	18	21½	21½
		Irresistible	1	22	27½	27½
	French	Iena	1	24½	...	...
	Japanese	Shikishima	1	18	21½	25
	Russian	Peresviet	2	18½	18	18
	U.S.A.	Kearsage	5	30	21½	27
1899	British	Bulwark	1	18	21½	21½
		Cornwallis	2	18	32¼	25½
		Glory	2	13¼	21½	21½
		Implacable	2	22	27½	27½
	French	Suffren	1	27½	...	27½
	German	K. Carl der Grosse .	2	21	...	18¾
	Japanese	Asahi	2	18	21½	25

Year of Launching.	Battleships.			Maximum thickness of Armour expressed in inches W.I.		
	Nationality.	Class and Number.		Belt.	Bulk-head.	Heavy gun positions.
1900	German	K. Barbarossa	1	21	...	18¾
		Wittelsbach	1	22	...	23½
	Japanese	Mikasa	1	18	21½	25
	Russian	Kniaz Tavritchesky	1	22	18	27½
		Pobieda	1	18½	18	18
		Retvizan	1	22	22	23½
1901	British	Albemarle	1	18	18	25½
		Duncan	4	18	32¼	25½
	German	Mecklenburg	4	22	...	23½
	Italian	Benedetto Brin	1	16	20	23½
		Regina Margherita	1	16	20	20
	Russian	Alexander III	2	22	22	23½
		Cesarevitch	1	23	22	25½
	U.S.A.	Missouri	1	27½	23½	27½
		Maine	2	25½	23½	27½
1902	British	Prince of Wales	2	22	27½	27½
	French	République	2	25½	...	27½
	German	Braunschweig	1	22	16	23½
	Russian	Kniez Souvaroff	1	22	23½	23½
		Orel	1	22	22	23½
1903	British	King Edward VII	4	22	27½	27½
		Swiftsure	2	...	...	23½
	German	Elsass	3	22	...	23½
	Italian	Regina Elena	2	23	20	20
Later than 1903	British	Africa	4	22	27½	27½
	French	Justice	2	25½	...	27½
	German	Lothringen	4	22	...	23½
	Italian	Napoli	2	23	20	20
	Russian	Evstafi	1	22	18	23½
		Ioann Zlatoust	1	22	18	27½
	U.S.A.	Connecticut	1	26½	18	23½
		Idaho	2	22	18	27½
		Kansas	4	25½	18	23½
		Nebraska	2	25½	16	25½

NOTE.—French and Italian armour of battleships launched in and after 1899, though recorded in previous *Naval Annuals* as Harveyed steel, is known to be practically equivalent to Krupp steel, and is treated as such in this table.

Taking the averages of heavy armour protection adopted by each nation for the last ten years, and arranging the nationalities according to value of belt protection on battleships, we get :—

Nationality.	Average Maximum Protection adopted over last Ten Years, expressed in Inches of W.I.		
	Belt.	Bulkheads.	Heavy gun positions.
French	26½	All continuous belts	27½
U.S.A.	26½	20	26¼
Japanese	22¾	21½	25
Russian	21¾	19¼	23½
German	21½	All continuous belts	22
Italian	20¼	18¼	20⅛
British	18¾	26⅓	25⅛

From the above it will be seen that Great Britain leads only in relative thickness of bulkhead armour, which France and Germany do not adopt at all. In armour for heavy gun positions, Great Britain comes third; but in respect of belt armour, our battleships, speaking generally, have less protection than those of any other of the leading navies of the world. The facts that coal-bunkers and protective decks form a reinforcement to belt armour, and that, judging from the experience available, a majority of the hits sustained in action occur not on the belt but on the upper works, may be argued to justify very moderate belt thickness; but it is to be observed that these and similar considerations presumably weigh with foreign experts as well as with our own, and so have no bearing on the comparison of British with foreign practice, which is the object of the foregoing tables.

It is not suggested that for the weight saved in heavy armour our Admiralty does not get good value in other directions; but it is always useful to draw attention to facts, even though the explanation of them may be, as it doubtless in this case is, perfectly satisfactory.

Manufacturing considerations governing adaptability of processes to various thicknesses of plates.

The possible methods of obtaining a hard face in combination with a tough back in an armour plate have an important bearing on the limits of thickness to which a given process is adapted. In the Harvey plate, for instance, the chemical composition of the face alone was varied at an advanced period of manufacture, so that, when ultimately chilled from a high uniform temperature, the face alone became hard and the back remained more or less unchanged. The absence in the back of a suitable molecular structure, however, rendered these plates liable to crack through under heavy blows. The face was hard enough, but the back was not tough enough. In the Krupp process, in addition to the use of a special and sensitive steel in the whole plate to start with, and the same subsequent variation in the chemical composition of the plate as Harvey employed, a differential heat in the final treatment is necessary. The operation of obtaining this—in any case a delicate and difficult one—becomes naturally increasingly so as the thickness of the plate is reduced. For this reason Messrs. Krupp refused, up to quite recently, to supply armour of less than 4 in. thick made by their process. Since the publication of the Charpy process, they have stretched this limit, and, like ourselves, have gone as low as 3 in.; but though the temptation to this course is obvious, there is room for doubt as to the expediency of it, for the nearer the difficulty of a process approaches the insurmountable, the more risk there is of the larger and more difficult plates, which have to be relied upon in war, eventuating less successfully than the smaller and easier ones that are subjected to proof in peace.

Classification of processes.

The Harvey process may be described as one of "varied chemical composition and unvaried heat," and the Krupp process as one of "varied chemical composition and varied heat." There remains one more alternative, viz., "unvaried chemical composition and varied heat," which is the principle of the K.N.C., or Krupp non-cemented plate. Of this material very little in favour can be said, because, for thicknesses suitable to the Krupp process, the average K.N.C. plate is very inferior in resisting powers; and as to facility of manufacture, the operation saved (that of cementation) presents no difficulty, although it is tedious and not inexpensive, points which are of no moment in comparison with efficiency. For thinner plates, the objection that rules out the Krupp process—that of difficulty of varied heat—obtains against the K.N.C. plates also. In short, if the final varied heat is reasonably practicable, Krupp plates are much to be preferred, and if it is not, K.N.C. plates cannot be made. Probably a presumed extra difficulty in correcting the warp of cemented as compared with uncemented plates has had to do with the selection of K.N.C. material for thin plates, but it is difficult to see that this objection is a real one. Neither plate, if properly face-hardened, will stand being made more convex in the cold state; and if less convexity is required, the plate that has been in the cementing furnace and had its back surface decarburised should have the better chance.

There is one condition and only one that affords a plausible argument in favour of omitting cementation in face-hardened plates, and that is when the convexity required is so great that a cemented face would be likely to tear open in the hot bending process; but this would be an argument for omitting it in thick plates as well as thin ones. All the evidence obtainable from careful inquiry goes to show that Great Britain is the only country in which K.N.C. armour is made for any but the most exceptional purposes. If face-hardening is omitted as well as cementation, then the Krupp steel makes an excellent tough homogeneous plate; but if face-hardening (which is difficult for thin plates) is required, it is much better to have cementation (which is easy) also.

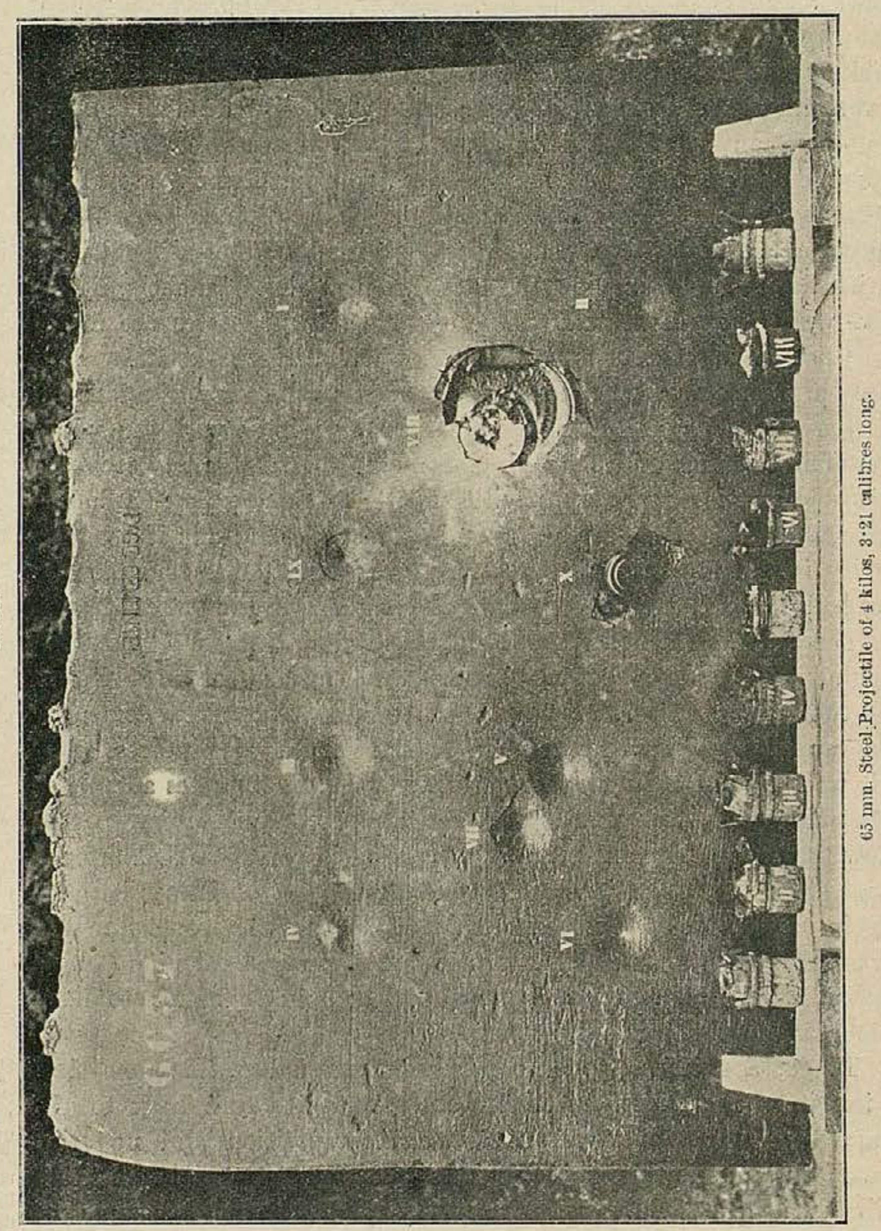
Proper lines to work upon for obtaining thin hard-faced plates.

To get a satisfactory hard-faced plate of a less thickness than 4 in., it would appear to be necessary, then, to turn back to the Harvey principle of "varied chemical composition and unvaried heat," but employing at the same time some special steel that will avoid the defect of the Harvey plate, namely, insufficient toughness in the back. This has been the subject of much research both in France and England, and probably in other countries as well.

Nature of the problem.

The problem is to find a steel of such a nature that, when chilled from a temperature sufficiently high to confer a fine crystalline

structure on the part that has been chemically varied (the face or supercarburised part), shall retain a suitable amorphous structure in the part that has not been chemically varied (the back or non-cemented part). Partly supercarburised steel in general, including



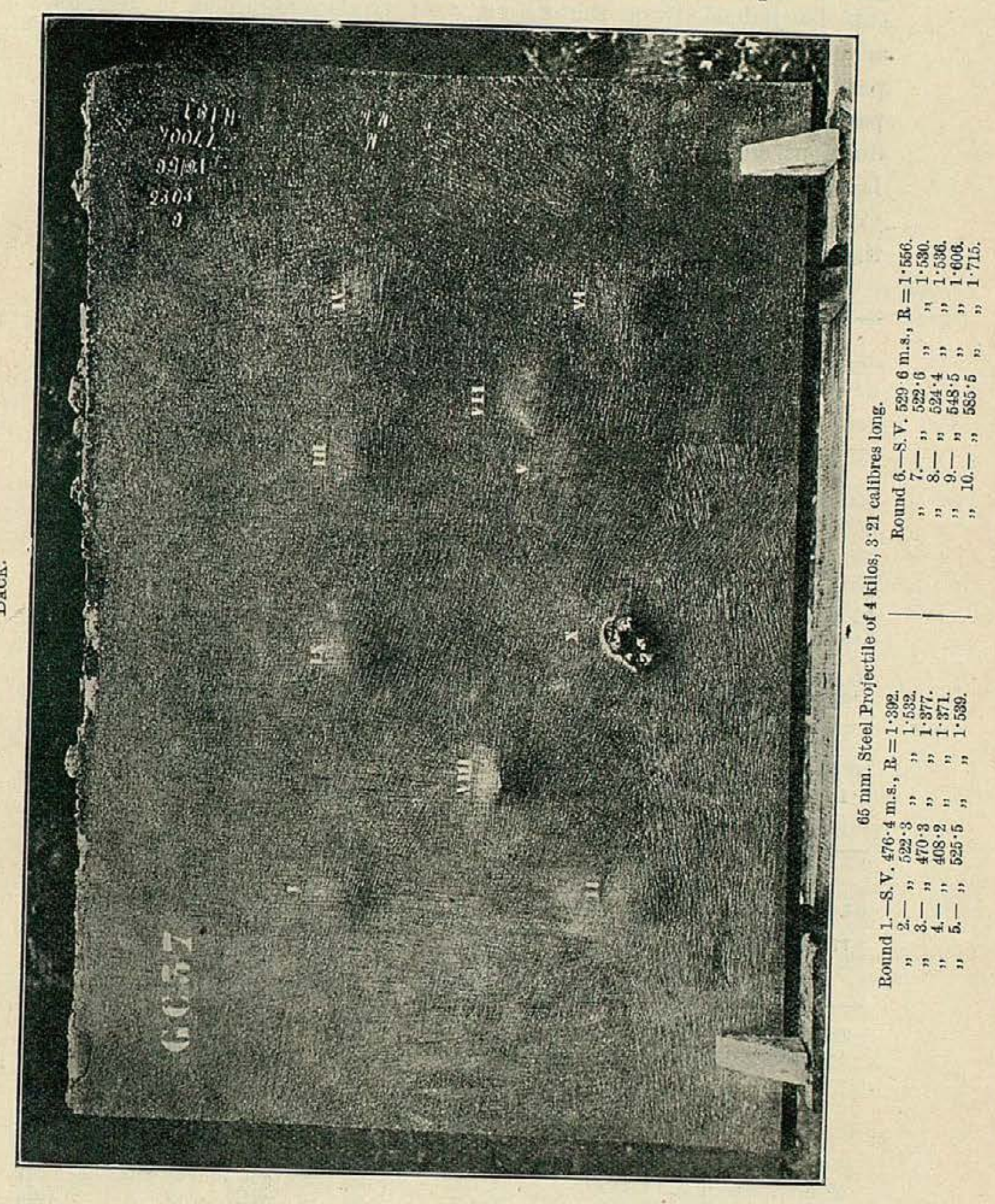
50 mm. Charpy Plate.
Tested at the St. Jacques Ranges, the 10th, 12th, and 15th August, 1903.
Face.

65 mm. Steel Projectile of 4 kilos, 3·21 calibres long.

Round 1.—S. V.	476·4 m.s., R = 1·392.		Round 6.—S. V.	529·6 m.s., R = 1·556.
" 2.— "	522·3 " "	1·532.	" 7.— "	522·6 " "	1·580.
" 3.— "	470·3 " "	1·377.	" 8.— "	524·4 " "	1·586.
" 4.— "	408·2 " "	1·371.	" 9.— "	548·5 " "	1·606.
" 5.— "	525·5 " "	1.539.	" 10.— "	585·5 " "	1·715.

Krupp steel, if chilled from any uniform temperature would either be too brittle in the back or not hard enough on the face. In England a steel having the requisite properties, and neither too

costly nor too difficult to make, has been found, and is being experimented with; but in France a considerable degree of practical success has already been achieved with a steel of quite a different kind, designed by Monsieur Charpy, Director of the St. Jacques Steel



50 mm. Charpy Plate.

Tested at the St. Jacques Ranges, the 10th, 12th, and 15th August, 1903.

Back.

65 mm. Steel Projectile of 4 kilos, 3·21 calibres long.

Round 1.—S.V. 476·4 m.s.,	R = 1·392.		Round 6.—S.V. 529·6 m.s.,	R = 1·556.
" 2.— " 522·3 "	" 1·532.		" 7.— " 522·6 "	" 1·530.
" 3.— " 470·3 "	" 1·377.		" 8.— " 524·4 "	" 1·536.
" 4.— " 408·2 "	" 1·371.		" 9.— " 548·5 "	" 1·606.
" 5.— " 525·5 "	" 1·539.		" 10.— " 585·5 "	" 1·715.

Works at Montluçon. This steel is of a somewhat expensive composition, being high in nickel, and presents the manufacturing difficulties that high nickel steel involves; but the results obtained

with it in plates of substantial thickness have been admitted by the Essen authorities to be nearly as good as those of their own Krupp process plates, and for thicknesses below 4 in., where the Krupp process stops or ought to stop, the Charpy plates constitute, as far as can be judged from the majority of trials examined, a decided advance on anything previously tested against an attack of a perforating as distinguished from a racking nature. The following particulars and the photographs of which the illustrations are reproductions, have been furnished by the courtesy of Monsieur Lévy, Director and Chief of the Technical Department of the Chatillon Commentry Company, who are the proprietors of the patent rights in the process of manufacture of these plates:

TRIALS OF CHARPY PLATES AT ESKMEALS, NEAR BARROW, IN CUMBERLAND.

Thickness of Plate.	Projectile.		Co-efficient of Perforation. De Marre System.	F.P.	Results.
	Calibre.	Weight.			
100 mm. 3·94 in.	12 cm. 4·72 in.	20·45 kilos. 45 lbs.	1·35 1·43 1·54	2·10 2·29 2·57	Not perforated.
			1·62	2·77	Perforated, but not a full-sized hole.
50 mm. 1·97 in.	57 mm. 2·24 in.	2·73 kilos. 6 lbs.	1·28 1·38 1·43 1·63	2·02 2·24 2·35 2·87	Surface of plate uninjured.
50 mm. 1·97 in.	12 cm. 4·72 in.	20·45 kilos. 45 lbs.	1·19	1·70	
30 mm. 1·18 in.	57 mm. 2·24 in.	2·73 kilos. 6 lbs.	1·32 1·40 1·44 1·75	2·02 2·20 2·31 3·09	Not perforated.
			1·86		Perforated.

Trials have also been made in Germany and at the home polygon at Montluçon. The following is an example, illustrated from photographs, of one of the tests made at the latter place.

TRIAL OF CHARPY PLATE AT MONTLUÇON, FRANCE.

Thickness of Plate.	Projectile.		Coefficient of Perforation. De Marre System.	F.P.	Results.
	Calibre.	Weight.			
50 mm. 1·97 in.	65 mm. 2·56 in.	4 kilos. 8·8 lbs.	1·392 1·532 1·377 1·371 1·539 1·556 1·580 1·536 1·606 1·715	2·20 2·54 2·15 2·07 2·55 2·58 2·53 2·55 2·73 3·01	No perforation and no cracks. It is to be observed that the cemented face does not get broken till the F.M. is well over 2·5. This characteristic is peculiar to plates made by the Charpy process.

Looking at these trials we observe that the 4-in. plate resisted perforation up to an F.P. of 2·57 and barely succumbed to an F.P. of 2·77, so its F.M. would be quite 2·7, which is a better result than attributed to an average 4-in. K.C. plate in Table IV. There was, however, a little doubt as to the quality of the projectiles in this trial. A report from Essen states that a coefficient on the de Marre system of 1·58 (say, corresponding in this instance to an F.M. of 2·66) perforated a 100 mm. Charpy plate, but not quite a 100 mm. Krupp plate, and that the trial at Meppen of a 50 mm. (1·97 in.) Charpy plate with projectiles of 75 to 88 mm., weighing 5·85 to 8·22 kilos, did not give as good results as could be obtained against this class of attack with homogeneous nickel steel plates.

Conclusion. The general conclusion is that the thin Charpy plates give extraordinarily good results against projectiles of small calibre whose energy is largely derived from velocity, but are not so well able to withstand comparatively heavy projectiles whose energy, equal in amount, owes less to velocity and more to weight. Still, if they have less resistance to "racking" or "smashing" attack than homogeneous plates they make up for it by great superiority against "perforating" attack, and it may be expected that face hardened plates of this class will at least supersede the unreliable K.N.C., for thicknesses from 4 to 2½ in. At the Meppen trial, above referred to, of a 50-mm. (1·97 in.) Charpy plate, two rounds out of a total of nine were fired with 87 mm. hemispherical-headed projectiles of 8·22 kilos. The first with a striking velocity of 251·7 m.s. nearly perforated, and the second, striking at 278·6 m.s., smashed its way completely through the plate. Seeing that De Marre's formula gives 297 m.s. as the velocity necessary for perforating ordinary steel with a projectile of this calibre and weight, the resistance of the Charpy plate to this attack was most disappointing. It does not imply, however, that the process of manufacture was defective, or that the individual plate inefficiently represented it, but rather that the "hard-face" principle breaks down when a certain limit of thinness of plate is exceeded and the attack at the same time is of a very heavy racking nature. Similar results have been observed at English trials of 2-in. hard-faced plates. Generally those that are the best against the 2·24-in. projectile of 6 lbs. are the worst against the 4-in. projectile of 25 lbs. It will be noted that at the Eskmeals trial of the 1·97-in. Charpy plate the only heavy round had a very moderate F.P., namely, 1·70, though ordinary steel claims an F.M. of 1·25. Maximum resistance to small high-velocity projectiles appears to be incompatible with maximum resistance to large and heavy projectiles when the plate is as thin as 2 in., so the selection

of material for such thin plates must depend upon the nature of attack they are expected to encounter most of.

Armour acceptance trials.

All the British armour-plate manufacturers have good results to show in passing the standard conditions of acceptance laid down by the Admiralty. One illustration typical of all is given.

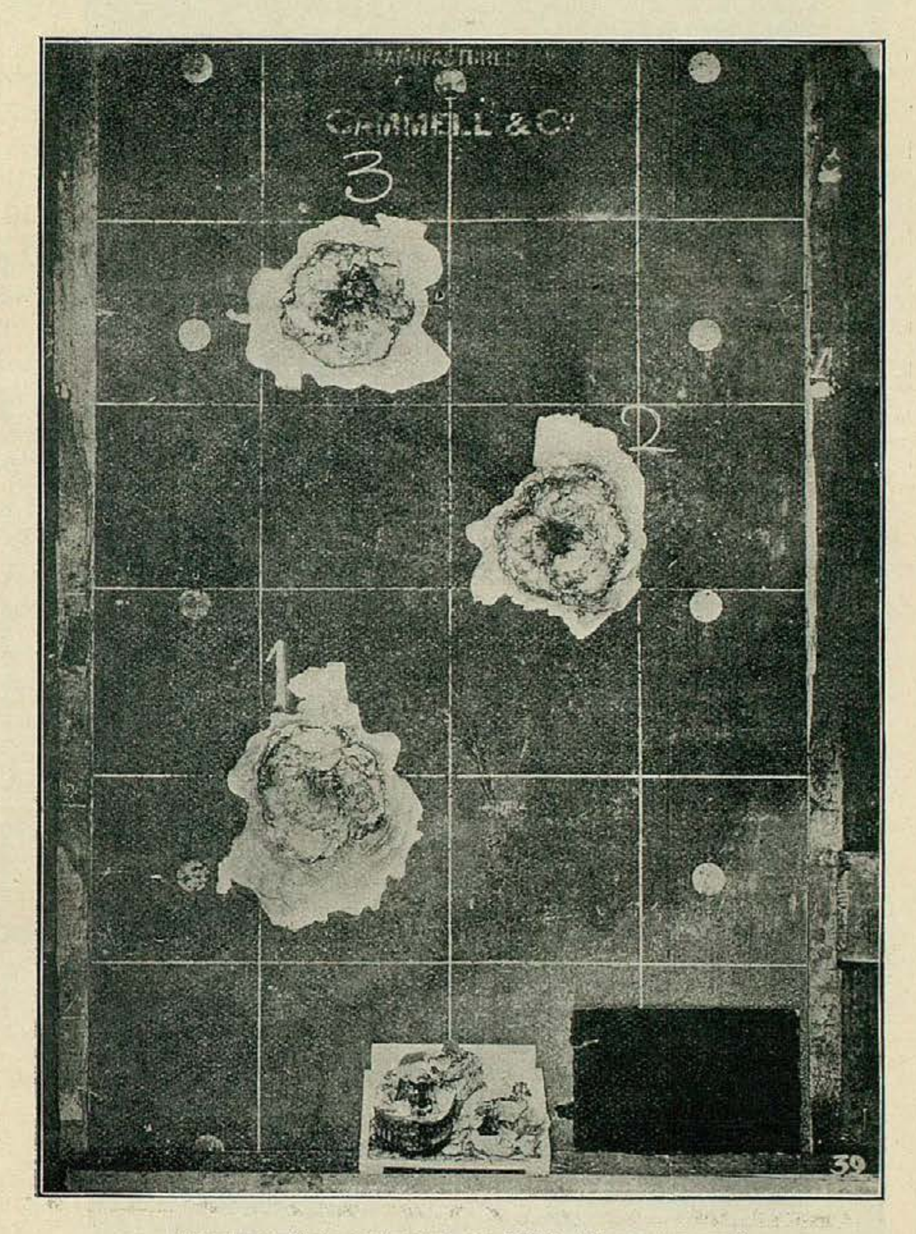
Acceptance tests in the United States of America made with capped projectiles have already been referred to under that head on a previous page.

Continental.

In illustration of Continental tests, Messrs. Marrel Frères, of Rive-de-Gier, in France, have kindly contributed a photograph and particulars of a trial made at the Gâvre polygon in January, 1904, of one of the plates manufactured for the belt armour of La Patrie. This was a cemented plate made by the special Marrell process, of which no particulars are available, but the results show that the quality obtained is about on a par with the Krupp process plates. Similar plates are made all over the Continent. The target was composed of the belt plate, 15 ft. 9½ ins. × 5 ft. 2½ ins., tapering in thickness from 10·9 ins. to 9·3 ins., backed with very thin wood and two ⅜-in. steel skin plates. The attack consisted of three rounds with St. Chamond forged steel armour-piercing projectiles of 9·45 in. calibre, weighing 317 lbs., distributed along the centre line of the plate and striking perpendicularly to its surface; the first round being for acceptance at standard price and the two others for premium. A photograph of the plate and projectiles is reproduced.

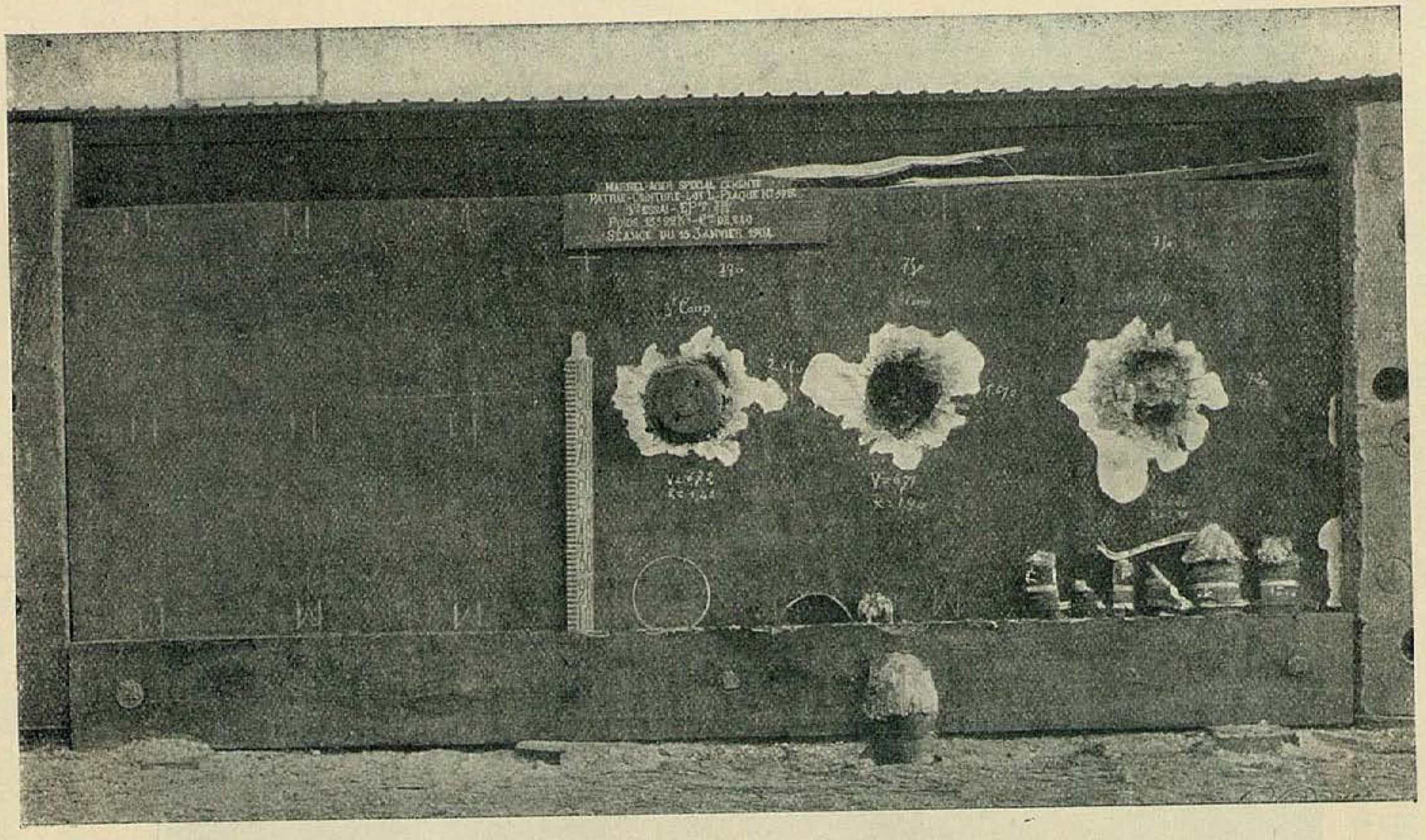
The first round struck near the right edge at 2054 f.s. The thickness of the plate here was 10 3/16 in., giving a factor of perforation of 2·0. The projectile lodged in the plate with its base projecting towards the firing point 7¾ in. Two longitudinal fragments were broken from the base. The plate was not cracked and only suffered the usual surface splintering; the rear skin plate showed an uncracked bulge 4 1/16 in. high and some rivet heads were sheared off. On the result of this round the lot of plates represented was accepted at normal price, and the "premium" rounds were then proceeded with.

The second round struck the centre of the right half of the plate, where the thickness was 10⅛ in. full, with 2201 f.s. velocity, giving an F.P. of 2·24. The projectile lodged unbroken, its base projecting 7⅝ in. The plate was not cracked, and in addition to the usual splintering of the surface at the point of impact the only damage it sustained was a general deformation making it concave to the extent of 3/16 in. horizontally and ½ in. vertically. The rear skin plate showed an uncracked bulge of 5⅞ in. high and some more rivet heads were



ACCEPTANCE TRIAL OF ARMOUR FOR H.M.S. "COMMONWEALTH."

View of Messrs. Cammell Laird & Co's 9-in. plate after passing standard test with three 9·2 in. projectiles of 380 lbs.



General View.

Trial Plate representing Lot L of belt of Battleship "Patrie" by Messrs. Marrel Frères.

sheared off. The concussion of this round broke away the rear portion of the previously fired projectile and left exposed the end of its chamber, which was then found to be $\frac{5}{16}$ in. below the plate surface.

The third round struck on the left of the previous two, where the thickness was $10\frac{1}{8}$ in., with 2208 f.s. velocity, giving an F.P. of 2·25. The projectile lodged unbroken, its base projecting $6\frac{7}{8}$ in. The effect on the plate was similar to that of the last round. The rear skin plate showed an uncracked bulge of $5\frac{11}{16}$ in. high, and further rivet heads were sheared off. The concussion of this round caused the projectile of round 2 to fall out, allowing its penetration to be measured as $13\frac{3}{16}$ in.

Judging by the penetrations obtained, which were not far short of perforation when the F.P. was 2·24, the F.M. of the plate may be put at 2·3, which is pretty close to that given in Table IV for a Krupp plate of the same thickness against uncapped projectiles. The acceptance test at normal price was based upon an F.P. of 2·0. The British Admiralty acceptance tests for plates of about the same thickness are considerably more exacting than this. It is to be noted however, that the plate showed a large margin of resistance to this attack and the backing was so extremely light that it may be regarded as almost unbacked. The flying about of rivet heads at each impact would be an awkward thing if it happened when the armour was installed on the ship, but this would presumably not be the case. The general result of the trial was considered so satisfactory that the lot of plates represented was accepted with the classification 6, being the highest obtainable, and entitling the manufacturers to a premium of 5 % over and above the normal price.

Some armour made by Messrs. Sir W. G. Armstrong, Whitworth and Co. for the Chilian Government was tested at the proving grounds of that firm by firing four 6-in. A.P. projectiles of 100 lbs. at a plate 8 ft. × 6 ft. × 7 in. representing the manufacture. The particulars were as follows: **Chilian.**

Round 1.	S.V. 2117 f.s.	F.P. = 2·16.	Penetration 2·8 inches.
„ 2.	S.V. 2096 f.s.	F.P. = 2.12.	Penetration $1\frac{1}{2}$ inches.
„ 3.	S.V. 2107 f.s.	F.P. = 2·14.	Penetration $1\frac{3}{4}$ inches.
„ 4.	S.V. 2103 f.s.	F.P. = 2·14.	Penetration about the same.

All the projectiles splashed on the plate without cracking it. Only the usual surface splintering was caused, and the bulges on the back were hardly noticeable. The trial was pronounced very satisfactory.

The same firm have now under construction at Elswick the Kashima, one of the most powerful battleships in the world, for **Japanese.**

the Imperial Japanese Navy. The armour, which is of the most up-to-date quality produced, is being made at the Openshaw works. On the 1st December, 1904, a trial was made with a sample plate of the thick armour selected from a batch. Capt. K. Iwamoto represented the Japanese Government. The plate measured 8 ft. × 8 ft. × 9 in. (2·43 m. × 2·43 m. × 228 mm.). It was backed with 2 ft. (61 cm.) of oak and a skin plate. The 9·2 in. projectiles used in this test



were made by Messrs. Thos. Firth and Sons, Ltd., the weight in each case being 380 lbs. (174·4 kilos).

The first round was fired with a striking velocity of 1814 f.s., giving an F.P. of 2·1. The result was a maximum penetration of 3·1 in. (78 mm.) and the flaking which is shown by the photograph, the back being bulged only to the extent of 1·9 in. high. The projectile was broken up into 155 pieces, the largest of which was 35 lbs. (16 kilos), weight of fragments recovered 208 lb. (94·5 kilos).

Round No. 2 was fired with a striking velocity of 1795 f.s., giving

an F.P. of 2·05. This round gave a maximum penetration of 1·25 in. (32 mm.) On the back of the plate a bulge 1·5 in. (38 mm.) high was produced. The fragments of shot recovered weighed 173 lb. (79 kilos), of which the largest piece weighed 28 lb. (13 kilos). At this stage the plate was formally accepted as satisfying all Service requirements of the Japanese Admiralty, and Rounds Nos. 3 and 4 were fired to determine the ultimate resistance.



Round No. 3 was fired with a striking velocity of 1889 f.s., giving an F.P. of 2·24. It caused a similar penetration to Round No. 1, viz., 3·1 in. (78 mm.), but less flaking. The bulge on the back of the plate was 1·9 in. (48 mm.) The projectile was broken up, 172 lb. (78·5 kilos) being recovered, of which the largest piece weighed 12 lb. (5·5 kilos).

Round No. 4, was fired with a striking velocity of 1985 f.s., giving an F.P. of 2·4. The penetration of this round was not measured, as the point of the shot stuck in the plate (see photograph). The bulge

produced at the back of the plate was 2·5 in. high (63 mm.) The remainder of the shot was broken up, 183 lb. (83·5 kilos) being recovered, the largest piece of which was 39·5 lb. (18 kilos).

At the conclusion of the trial no surface or through cracks were developed, and the quality of the plate was undoubtedly excellent, seeing the resistance was proved to be still some distance from exhaustion when the F.P. was 2·4. The F.M. of an average 9-in. plate of this class is given in Table IV, as 2·45, i.e., perforation might be expected when the F.P. exceeded that of Round 4 of this trial by 0·05; but the above described plate seemed to have more in hand than this. The addition of 0·05 to the F.P. of this round would have required an addition of only about 25 f.s. to its striking velocity.

Cast-steel armour.

No progress is reported in the matter of cast steel armour which has been experimented upon by Krupp and Hadfield. That made by the latter is thought by some to be of high manganese steel. The *Engineer* of 6th January last, made reference to a 6-in. plate of this kind which Messrs. Hadfield had had tested, under the name of Era, with a 4·7-in. armour piercing shell at 2100 f.s., and a lyddite 6-in. shell at 2035 f.s., both of which were resisted. No further details are available. The F.P. of the first named round would be 1·88 and of the second 2·36, but the latter, being presumably with a common shell, gives no indication as to the F.M. of the plate. Still, judging by the 4·7-in. round the plate, as a cast plate, deserves much credit.

Armour-plates dependent on sea-borne materials; except iron.

Of the materials which go to form a modern armour plate practically all are imported in ordinary course of trade. The iron which constitutes upwards of 90 per cent. of the whole could be, though for the most part it is not, made in this country from Cumberland ores. Plates manufactured from such iron have been experimentally tested and have given as good ballistic results as those made in the usual way.

Nickel.

Nickel, of which very large stocks are held by British manufacturers, is chiefly obtained from ores found in the French Colony of New Caledonia. Part is imported in the ore and smelted and refined at Glasgow; part is brought in, already smelted, in the form of matte and refined here; and part is imported in the finished state as refined nickel. Dr. Ludwig Mond, by his recently perfected process for obtaining nickel from the Canadian copper-nickel ores, has brought a possible source of supply as near as one of our own Colonies, and an armour plate in which only Canadian nickel was used has satisfactorily passed the Admiralty ballistic tests. Still, wherever the consignments come from, they have to reach us from over the sea, and so are liable to be interfered with in case of a war with a strong naval Power.

The same is true as regards other necessary ingredients of armour such as ferro-chrome and ferro-manganese. The latter is especially important, as the ore comes from the Caucasus, Chili, Brazil and India—all distant places—and dependent on it is the production not of armour plates alone but of steel for all purposes. Speaking generally, the stocks of ferro-chrome held in this country are seldom large, but those of ferro-manganese might be relied on to provide five or six months' consumption at ordinary rates. Ferro-chrome and ferro-manganese.

Plates so thin as only to be serviceable against small arms would seem at first sight to constitute a subject a little outside the scope of a discussion of armour for naval purposes; but there is at least one excuse for referring to them in this connection, namely, that bullet-proof shields might prove well worth carrying in the smaller class of war vessels at least, if only for facilitating the approach to shore and the disembarkation of landing parties. That the time is close at hand when this nature of defence must be given a serious place in land warfare it is difficult to dispute. War is becoming more and more an engineering undertaking that must be conducted—to be conducted successfully—on engineering lines. There is no less demand for personal valour than there used to be; perhaps even there is more; but the ever-increasing deadliness of modern weapons tends continually to narrow down the line of separation between heroism and folly. One man who cuts away a wire entanglement under cover of a shield is of more service to his country than a hundred who lay down their lives in the vain attempt to do it without one. The serious consideration of shields as part of the regular equipment of an army in the field has hitherto been hindered by two objections: one sentimental, the other material. Sentiment is surely a little out of place in matters affecting the position, sometimes even the existence, of nations. The recent fearful losses of the Japanese in attacking the Russian entrenched positions in Manchuria show the absolute necessity for some portable cover for the attackers if they are to have a chance of success. The Japanese themselves found this out after paying thousands of lives for the experience, and in the later stages of the siege of Port Arthur they appear to have extemporised more or less efficient shields out of such plates as were available. The material objection is principally that of adding to the weight of what the soldier has to carry, hampering his movements, and detracting from his mobility. This would be a serious objection as against a shield forming part of the soldier's personal equipment, but it does not apply to shields taken to the front in case of emergency—kept, say, with the reserve ammunition, unless and until an occasion for their use arises, such Bullet-proof shields.

as the attack of a carefully prepared entrenched position principally defended by infantry fire. In such a case suitable shields properly used should go further towards equalising the attack with the defence than a four to one numerical superiority. Shields of some kind will have to be used if the attackers are to be kept alive while they destroy the obstacles which, by preventing them from advancing quickly, give the defenders time to prevent them advancing at all.

Of course there would be cases where shields would be useless—where the ground was well covered by artillery fire, for instance; but the fact that they were kept in readiness to the attackers' hands would be of no small value, if it did no more than compel the defence to always provide artillery fire when otherwise infantry fire would suffice. Numerous cases occur in every campaign—witness our loss of guns at Colenso—when serious disaster might be averted or important advantage gained if only the means were at hand to enable a proportion at least of a detachment to advance over, and retire unscathed from, a musketry-swept area.

Resistance and weight of bullet-proof steel.

The special steel now manufactured for the purpose is stated by Messrs. Cammell, Laird and Co., who make a speciality of the material, to be proof as under:—

Against Mauser or Mannlicher rifles at	20 yards	. $\frac{1}{4}$ inch
„ Lee-Metford or Lee-Enfield „	„	. $\frac{3}{16}$ „
„ „ „ „	300 „	. $\frac{1}{8}$ „
„ „ „ „	500 „	. $\frac{1}{10}$ „
„ „ „ „	700 „	. $\frac{1}{16}$ „

that is for normal impact; against oblique impact the efficiency of each thickness would be greater.

The approximate weights for these thicknesses per super foot are respectively—10 lbs. 4 oz., 7 lbs. 11 oz., 5 lbs. 2 oz., 4 lbs. $1\frac{1}{2}$ oz., and 2 lbs. 9 oz., so that it should not be difficult to design very efficient shields of a sufficiently portable nature. It would be not so much perhaps the main attacking party who would use them, as their pioneers, who, under cover of them, would destroy or neutralise the obstacles constructed by the defenders to check a rush.

Armoured motor tractor.

An armoured motor tractor was exhibited at the end of last year with a sort of expanding bullet-proof back intended to give shelter for ambulance work in the field, but its weak features, from a military point of view, were so obvious that it was calculated rather to check than promote any movement towards the adoption of bullet-proof shields. The number of cases in which these would be encumbrances and worse than useless is admittedly great, but there remain at the same time numerous other cases where they would be simply invaluable. It is to a due recognition both of their advantages and their

limitations that the more or less general adoption, at no very distant date, of bullet-proof shields will be due.

Trials of armour, in this country at least, have hitherto been confined to the test of the mere material as against perforation, cracking, etc., and it is believed that no experiment has ever been made of the resistance to *deformation* of a completed modern armour structure such as a gun shield, turret, barbette or, above all, a casemate. The desirability and importance of such a test has been repeatedly pointed out both in this and other technical publications. Economy of internal space is always and naturally a most important point in the design of naval gun positions, from which it follows that the clearances between the gun mounting in its different positions and the interior surface of the protective armour are often cut very fine. There is no objection to this if they are not cut too fine, but who can possibly say where the line is to be drawn without some actual experiment to go upon. The point calls for serious consideration, and some action should be taken with regard to it, as it obviously affects the whole efficiency of the fighting machine; for of what use is it to provide a gun with a shield that can keep a projectile from striking it, if at the same time that shield, undergoing as it must some deformation in resisting the blow, encroaches too far upon the internal clearances, jams the mounting, and puts out of action the gun it is intended to protect? And all because the clearances have been made just a little too small!

Armour is thoroughly tested for "strength" but ought to be tested for "stiffness" also when used unbacked to form structures.

This is not likely to occur with backed armour as the backing may generally be relied on to absorb the deformation referred to, but it applies to all unbacked armour protecting gun positions, and especially to the thinner kinds, and notably to casemates. It is not the high velocity blow approaching the limit of the armour plate's resistance to perforation that is alone to be feared, but also a low velocity racking blow, such as that of a heavy projectile exhausted as to perforating power owing to length of range or ricochet. The least effect such a blow landing on a casemate can have will be to bend back a wing or to cause some flattening of the shield inwards. How much will that bending or flattening be; and will it or will it not exceed the clearance, sometimes extremely small, allowed between the gun mounting and plate? These are questions to which war will furnish an answer; would it not be as well in time of peace to make sure of the answer being a favourable one? Testing a plate in the usual way for ballistic resistance furnishes no information on the point, the conditions of support being altogether different.

Action in France.

In August, 1903, the French Government carried out a costly experiment on the turret of the Masséna, which was fired at by the

12-in. guns of the Suffren, with the object not of testing the Masséna's turret armour—which could be better done on shore in the usual way—but of testing her turret as a structure and to ascertain whether the shock of blows within the power of the armour to resist were, or were not, in the power of the structure to support without serious derangement. No official information as to the result is available, but the matter is alluded to to show that one foreign country at least is alive to the importance of testing armoured structures for resistance to deformation, as well as the armour itself for resistance to perforation.

CHAPTER II.

Progress in Gunnery.

Although it is perhaps too early to appreciate in their full significance all the lessons that are to be learned from the naval war in the Far East, it may safely be assumed that strong confirmation has been given to the often expressed opinion that naval engagements in future will be carried out at ranges which, a very few years ago, would have been considered quite useless for producing any decisive result. No doubt the circumstances under which the Japanese were placed were somewhat unusual, and imposed on them the necessity of risking as little as possible the loss of a single ship; but the fact that in the battle of August 10th a powerful fleet was dispersed and rendered ineffective entirely by gun fire, carried out for the most part at ranges from 6000 to 12,000 yards, will be a strong inducement to any fleet having confidence in its armament and shooting powers to elect to fight at ranges upwards of 6000 yards. No complete account has been published of the details of the damage received by the ships of the Japanese squadron, as, following their usual practice in these matters, very little information has been allowed to leak out, but there is reason to suppose that it must have been far from inconsiderable; the Mikasa in particular is said to have suffered rather severely, and to have had only one of her 12-inch guns in action at the close of the engagement. There is little doubt, however, that the Russian losses were the more severe, due probably to the superior gunnery of their opponents, and to the latter being provided with telescopic sights, one of the first essentials for accurate shooting at long ranges. Assuming that long-range battles will in future be the rule and not the exception, the latest projected additions to our Navy in the shape of battleships are of special interest. In these, the ships of the Lord Nelson class, the elimination of the 6-inch gun, so long advocated by many, has at last been carried out, and the armament will consist, besides the smaller Q.F. guns, of four 12-inch and ten 9·2-inch guns, all of the latest pattern, and a great advance on the present service guns of the same calibre.

Probability of long range fighting in future.

In order to realise the increase of power which has been obtained in these ships, it will be useful to make a comparison with other ships of earlier date, each typical of a numerous class—namely, the

Gun power of battleships.

Majestic, the Formidable, and the King Edward VII. The guns of equal calibre on these ships are very similar in their rate of fire, and though those of the latest type have improvements in their mechanisms and loading arrangements, which tend to increase their rate of fire, it has been assumed that they are equal in this respect in compiling the table:—

Name of Ship.	Nature of Fire.	Armament Available.	Weight of Shot per minute.	Muzzle Energy per minute.	Striking Energy per minute at 6000 yards.
				ft. tons.	ft. tons.
Majestic . . .	Broadside	4 12", 6 6" Q.F.	6400	228,600	82,142
Formidable . .	Broadside	4 12", 6 6" B.L.	6400	265,410	89,520
King Edward VII.	Broadside	4 12", 2 9·2", 5 6" B.L.	7420	315,755	108,800
Lord Nelson . .	Broadside	4 12", 5 9·2"	7200	433,200	175,820
Majestic . . .	Bow	2 12", 2 6 Q.F.	2700	98,214	36,946
Formidable . .	Bow	2 12", 4 6" B.L.	3700	153,680	49,320
King Edward VII.	Bow	2 12", 2 9·2" and 2 6" B.L.	4220	183,050	64,040
Lord Nelson . .	Bow	2 12", 4 9·2"	4740	289,200	133,440

The rates of fire, taken as a basis, have been one round per minute from the 12-in. guns, two rounds per minute from the 9·2-in. guns, and five rounds from the 6-in. guns, either B.L. or Q.F. These rates undoubtedly have been often exceeded, but for anything more than a very restricted period of time it is very unlikely that they would be surpassed. Although the rates of fire have been assumed to be the same, the powers of the successive types of gun are very different—for instance, the 6-in. Q.F. guns of the Majestic have a muzzle energy of only 3217 f.t., while the 6-in. B.L. of the King Edward VII. have 4195, and in the later ships of this class the muzzle energy will be nearly 6500 f.t. The difference is equally marked in the case of the main armament, the muzzle energies of the 12-in. guns being 33,000, 34,890, and 47,800 f.t., respectively. It is probable, however, that with an M.D. cordite charge the energy of the guns of the King Edward will be much increased, and will reach nearly 39,000 f.t.

In this table the progressive increases in power are very clearly shown and the importance of the heavy gun at long ranges well brought out. Thus, taking broadside fire, the successive increases in muzzle energy per minute are 16, 38, and 46 per cent., but at the range of 6000 yards, where the benefit of the heavy shell is most felt, the striking energies increase by 9, 32, and 110 per cent. The

increases in fire ahead are even more marked, but in this respect the Majestic class are very poor, having only two 6-inch 40-cal. guns capable of assisting the 12-inch, and at 6000 yards these are barely worth considering. The bow fire of the Lord Nelson is more than a match for the broadside of the Formidable, even at close range, while at long ranges it is considerably higher than even the broadside of the King Edward. The gain of power at the longer range naturally carries with it greater penetrating power, and the 12-inch guns of the Lord Nelson will be capable of perforating 12 inches of the latest K.C. armour, while those of the Majestic are scarcely equal to 8½ inches. The 12-inch guns of the latter are, moreover, equalled in penetrative power by the 9·2-inch of the Lord Nelson, while the 9·2-inch of the King Edward VII. will be defeated by six inches of K.C. at 6000 yards. It is possible, perhaps, that some falling off in the rate of fire may be experienced with the 9·2-inch in double turrets, and it has yet to be ascertained that the blast from such heavy and long guns as these will not be seriously detrimental, when firing ahead, to the sighting of the 12-in. guns.

In armoured cruisers of recent design the growth of power has been equally striking, the tendency in all important navies being to build these of the heaviest type, with armaments almost equal in power to that of the older battleships. The following list gives the guns of some of the newest cruisers. Armoured cruisers.

Minotaur.	Black Prince.	Drake.	Washington.	Renan.
4 9·2-in.	6 9·2 in.	2 9·2-in.	4 10-in.	4 7·6-in.
10 7·5-in.	10 6-in.	16 6-in.	16 6-in.	12 6·4-in.
28 3-pdrs.	28 3-pdrs.	12 12-pdrs.	23 14-pdrs.	22 3-pdrs.
		3 3-pdrs.	12 3-pdrs.	2 1-pdr.
			4 1-pdr.	

The cruiser may be called upon for very serious fighting in breaking through the screen of an enemy's squadron to ascertain the strength of the main force; and this demands that her guns should be as heavy as she can carry, with due consideration to her speed. Some adverse criticism has, therefore, been aroused by the allotment of ten 6-in. guns to the Black Prince; and that this was not altogether unfounded is shown by the substitution of four 7·5-in. guns in her later sisters. It should be noted, however, that the gun employed will be an improvement on the present service 6-in., with

about 40 per cent. more energy and considerably greater penetration; in fact, it will be the equal at 5000 yds. of the latter at 3000, and capable of dealing with a 6-in. Harveyed belt at 4000 yds. The 9·2-in. guns of these ships will be of the existing pattern, but they are sufficiently powerful to pierce the side armour of any cruiser at 6000 yds., and can put a capped A.P. shell of the latest type through nine inches of K.C. armour at 3000 yds. The 7·5-in. guns will be of the latest pattern, and considerably more powerful than the French 6·4-in., or the German 6·7-in., six inches of K.C. armour not being proof at 4500 yds.

Objection has been raised to the placing of eight of the 7·5-in. guns on the Minotaur in double turrets, it being urged that the rate of fire obtained from the two guns is little better than that from a single gun; but had these been dispensed with it would have been necessary to place some of the guns in battery, with a consequent restricted arc of fire and probably loss of command. A more serious cause for objection is the decision to install nothing heavier than the 3-pdr. in the light Q.F. armament; no gun smaller than a 12-pdr. can be relied upon to stop a torpedo-boat outside torpedo range, while for destroyers it is doubtful whether even these are sufficient. The Renan is in much the same position in this respect, but the Washington has a great advantage in her twenty-three 14-pdrs. The Admiralty have, however, recently adopted a semi-automatic 3-pdr. designed by Vickers, which is of a greatly improved type in regard to rate of fire, flatness of trajectory, and increased danger space; and if it is this gun that is to be mounted, reliance is no doubt placed on the power to obtain an overwhelming number of hits in a very short space of time.

Growth in power of guns.

No great changes in systems of construction of ordnance are to be recorded, but the improvements in existing types of all calibres have been considerable. It must be remembered that the process of evolution of the modern heavy gun must necessarily be a slow and gradual one. Too large a step in advance, without making sure of the ground to be covered, is apt to lead to disaster; as has often been proved in the past, notably in recent times by the failure of the American heavy guns to stand the large increases of forward pressures obtained with an improved propellant. There are many points that require to be considered when improving the design of any type of gun, which attain different relative values at the various stages of evolution; such are the size and shape of chamber, maximum pressure allowable at the muzzle, twist and form of rifling, nature of driving-band, and last, but by no means least, the form of propellant. In the early B.L. gun, such as the 12-in. 25-calibre,

using quick-burning powder, the pressure rose to its maximum before the projectile had moved more than a calibre down the bore, fell off almost at once, and decreased rapidly as the shot neared the muzzle to a minimum of little more than three tons. Little advantage was therefore to be obtained by lengthening the bore, and the gun consequently was short, thick at the breech end, tapered rapidly towards the muzzle, and had a small chamber. With the introduction of a smokeless propellant which could be more easily controlled in rate of burning, it became possible to maintain approximately the maximum pressure for a considerable distance down the bore, and, at the same time, to more than double the pressures at the muzzle. This necessitated a large increase in the size of chamber and increased strength in the forward part of the gun; and, at the same time, enabled much higher velocities to be obtained by lengthening the bore, so as to utilise through as great a distance as possible the large pressure on the base of the projectile. Hence we have the present type of B.L. gun, reaching to 50 calibres in length, cylindrical for a large portion at the breech end, and tapering very gradually towards the muzzle. By modifying the form of propellant it is possible to obtain a very regular curve of pressures along the bore, even with the present long guns, the maximum pressure developing slowly and falling off very gradually as the shot nears the muzzle. By this means very high muzzle velocities would be secured, which would on paper give an extremely powerful gun. If, however, the muzzle pressure is too high (and the limit seems not to be much above eight tons, if as much) the projectile is unsteady in flight, and the shooting becomes so erratic that the value of the gun is seriously discounted. It is also necessary to secure the complete combustion of the propellant before the shot has left the muzzle, otherwise varying quantities are expelled unconsumed, and irregular velocities are experienced from round to round which are hopelessly detrimental to accurate shooting, especially at long ranges.

Systems of rifling.

As regards rifling, the increasing twist has been employed for several years both in this country and in the United States, and has given very satisfactory results with velocities up to 2600 f.s., but now that velocities are increasing far beyond this point it is found to have certain drawbacks, and expert opinion on both sides of the Atlantic now seems to be in favour of a uniform twist combined with an increased number of grooves, as giving less frictional resistance and lower mean pressures on the material of the driving-band. With respect to the latter, copper has been found to be an unsuitable material for these high velocities, and better results are obtained with a harder alloy of cupronickel, and it is not at all improbable

that a still harder material will be found necessary for guns of the latest type. The following table shows very clearly the immense growth of power in guns of various calibres that has taken place within the last ten years:—

Nation.	Nature of Gun.	Weight of Gun in tons.	Weight of Projectile.	Muzzle Velocity.	Muzzle Energy.	Energy per ton of Gun.
					ft.-tons.	
British	12 in., Mark VII.	46	714	1914	18,136	394
	12 in., Mark VIII.	46	850	2367	33,022	718
	12 in., Mark IX.	50	850	2481	36,280	724
	12 in., E.O.C.	58	850	2900	49,568	854
French	12 in., 1893	45·9	643	2625	30,750	670
	12 in, 1896	44·4	750	2650	36,782	830
	12 in., 1902	50	750	2870	42,890	858
British	9·2 in., Mark VII.	22	380	2065	11,240	511
	9·2 in., Mark VIII.	25	380	2347	14,510	582
	9·2 in., Mark X.	28	380	2601	17,830	637
	9 2 in., E.O.C.	28	380	3030	24,190	864
French	9·45 in., 1884	17·9	317	1969	8539	477
	9·45 in., 1893	22·4	317	2625	15,170	702
	9·45 in., 1896	23·6	317	2870	18,100	736
British	6 in., Mark VI.	5	100	1960	2663	533
	6 in., Mark VII.	7·4	100	2730	5160	698
	6 in., Mark XI.	8·6?	100	3060	6493	755
French	6·5 in., 1884	4·9	99	2100	3061	623
	6·5 in., 1893	6·9	115	2625	4730	687
	6·5 in., 1896	8·1	115	2870	6568	811

In examining the table, we see that not only are the successive increases in muzzle energy very large, but that they have been secured by comparatively moderate additions to weight of gun, the result being that the gun is much more efficient, regarded purely as a machine, the energy produced per ton weight of gun having grown nearly as quickly as the total energy. The French guns give quite as good factors of effect as the British, but they are, on the average, somewhat lighter and their muzzle energies correspondingly smaller. The large effect produced by increasing the weight of the shell is well exemplified in comparing the 1893 and 1896 12-in. French guns, the velocities differ by only 25 f.s., but the addition of 107 lbs. to the weight of the projectile has given an increase of 6000 f.t., or nearly 20 per cent. to the muzzle energy.

We seem now to have reached the greatest length that is practicable in guns of the latest type, as, apart from the difficulty of ensuring sufficient rigidity and freedom from tendency to droop at the muzzle, the further the centre of gravity is moved forward, the larger must be the amount of armour required to protect the breech

end and loading-gear; and as muzzle pressures, as previously mentioned, must at present be regarded as incapable of increase, the natural direction in which to look for increase of power is by increasing the maximum pressure and maintaining it further along the bore, whilst keeping the final pressure at its present figure. Hitherto, a pressure of 17 tons per square inch has been regarded as the maximum permissible, though in some of our more recent guns it has lately been increased to 18 tons; but there seems no adequate reason why a pressure of 20 tons per square inch should not be worked up to; indeed, the Elswick Ordnance Company have already designed a 9·2-in. gun calculated for a working pressure of this amount. Using the wire system of construction, there should be no difficulty in providing sufficient strength without unduly increasing the weight.

Improvement in material necessary.

In the case of guns made entirely from forged tubes the question is not so simple, and probably some improvement in the quality of material will be necessary before it can be carried out. Nickel steel is the material that naturally suggests itself in this connection, as when sound it represents a great advance on ordinary steel in regard to tensile strength and elastic limit; the former being about 30 per cent., and the latter as much as 50 per cent. higher than in the case of the mild steel usually employed. No Power has yet adopted it for heavy guns, owing to the difficulty of obtaining thorough soundness in large forgings, though a commencement in this direction has been made both in this country and in America by utilising this material for the new type of field-gun; the forgings, however, for these are comparatively small. Some prospect of the removal of this objection is held out by the introduction of the Harmet process of casting, which is being extensively adopted in this country. By this process the metal, while still fluid, is subjected to very heavy compression from the lower end, and it is claimed that the material is free from cavities and piping, and that very little wastage occurs in making the forging, the inventors stating that the increase in the amount of available metal is not less than 25 per cent.

Wire system of construction.

England is still the only country that uses the wire system of construction, though experiments are being made in America with wire guns of different types, probably with the idea of obtaining a sufficient increase of strength for their slow-burning powder in the forward part of the gun without adding materially to the weight. The great advantages of wire in ensuring thoroughly sound and strong material are sufficient to outweigh the disadvantage of lack of longitudinal and girder strength, especially as no great difficulties have been experienced in adequately providing for strength in these

respects by the inner tubes and outer coverings. France and Russia have tried this system, but it was abandoned by both on account of the expense of manufacture and difficulties encountered in retubing the interior, the latter an important point with guns such as ours that use a nitroglycerine powder. Here, however, the last has been successfully dealt with, though, of course, the operation of retubing is a lengthy one, and can only be carried out where gun-manufacturing plant is available.

The tendency to increase of length in guns of all calibres has been well marked on the Continent and in America, as well as at home. France was the forerunner in this respect as much as fourteen years ago, when guns of 40 and 45 calibres were introduced, whilst ours of that date as a rule did not exceed 30. But though the step, in the light of subsequent experience, has been proved undoubtedly a wise one, too much was sacrificed to obtaining high velocities, and to this end the French were content with light-weight shells. This is a far from sound basis on which to work, as loss of weight in the shell entails a corresponding loss in muzzle energy, and the diminution becomes more heavily marked as the range increases, loss of velocity being inversely proportional to the sectional density of the projectile, and the heavy shell has a great advantage in range and flatness of trajectory. Thus, if we compare the 12-in. Elswick gun with shot of 850 lbs. and velocity 2900 f.s. with the French 45-calibre gun of the same velocity, but with a shot of only 750 lbs., we find that the muzzle energies are 49,500 f.t. and 43,700 f.t. respectively; but at 5000 yards the velocities are 2120 f.s., as against 1985, whilst the striking energies are 26,500 f.t., as against 20,520 f.t. The penetration is also seriously affected, for at 5000 yards the French gun will only perforate 26 in. of iron, while the Elswick gun will easily perforate 31 in. Even greater variations are shown if we compare the French 9·45-in., with its velocity of 2625 and shot of 317 lbs., with our present service 9·2-in., with a velocity of 2601 and shot of 380 lbs., for their respective energies at the muzzle and at 6000 yards are 17,830 f.t. and 6250 f.t., as compared to 15,170 f.t. and 4140 f.t., while at the latter range the 9·2-in. will get through an additional inch of the latest K.C. armour. Germany has also committed the same mistake with their heaviest naval gun, the 11-in., the shot of which should weigh 650 lbs., to be in the same proportion as the British or American 10-in. or 12-in., whereas it is only 595 lbs.

New French gun.

France is now reported to have adopted a 50-calibre 12-in. gun, no other country having as yet ventured upon more than 45 calibres. This gun will be an extremely powerful one, though with the usual

defect of a shell of 750 lbs.; the weight is to be 61 tons, and a muzzle velocity of 3035 f.s. is expected. The higher ballistics are obtained by enlarging the chamber, and forward strength by reinforcing tubes along the chase; the thickening of the chase, combined with the increased length, indicates that the centre of gravity has been moved further forward from the breech end, and it would appear that this will entail a very considerable addition to the weight of armour required to protect the breech and loading mechanism.

German guns.

Germany shows no sign of reconsidering her decision to use nothing heavier than the 11-in. gun, and the latest of this size is only 40 calibres long, though the velocity (it is credited with 2700 f.s.) is good. For some years the Germans have devoted much attention to the development of heavy Q.F. guns, having tried a metallic cartridge-case in as heavy a gun as the 9·45-in. The system, however, cannot be commended, as, apart from the question of the disposal of the fired cases (an awkward matter on board ship with large guns and rapid fire), it does not lend itself to the easy realisation of high ballistics. With slow-burning propellants a large chamber is necessary, and this can only be obtained by either enlarging the breech opening, with the consequence that a heavy and unwieldy breech screw is required, or by increasing the length, which reduces the distance of shot travel, and is moreover apt to generate dangerous wave pressures.

United States guns.

The United States have adopted a 12-in. of 45 calibres for the battleships of the Connecticut and New Hampshire classes, of about the same weight as the new French gun, but considerably more powerful, as its velocity of 3000 f.s. will be obtained with a shot of 850 lbs. In medium guns they have nothing better than the 8-in. of 45 calibre which is a very inferior weapon to our present 9·2-in., especially at long ranges, and not even equal to the latest 7·5-in. The failure of several of their older guns, through high forward pressures and faulty material, has directed their attention to the merits of wire-wound guns, and two 6-in. guns on this system have been made, with which they expect a muzzle velocity of 3540 f.s. One of the main features is the large size of the powder-chamber, which is nine inches in diameter, with a capacity of 3120 cubic inches (as compared with the 1715 cubic inches of the 6-in. Mark VII.). Though the working pressure is to be high, nearly 19 tons per square inch, with such a high velocity the muzzle pressures will probably be very great, and the shooting is likely to be somewhat erratic. Moreover, trouble may be expected with the rifling and driving-bands when the trials are carried out. Difficulties in this latter direction have already been experienced with their 12-in. and 10-in.

guns, and quite recently it has been found necessary to return the projectiles of those natures to be fitted with a new type of band. Much attention in America has been directed to the development of coast artillery, but they do not seem at present inclined to repeat their 16-in. B.L. gun, which, with its shot of 2400 lbs. and muzzle velocity of 2317 f.s. is likely to long remain the largest and most powerful gun in the world.

Mortars and howitzers.

An interesting point is the large extent to which provision has been made of 12-in. mortars in coast batteries, nearly four hundred of which have been already supplied. These are mounted so as to be practically out of reach from attack from the water, and are said to make, with the aid of long base horizontal range-finders, very accurate shooting up to 10,000 yds. If we remember the effect that the 11-in. Japanese howitzers had on the Russian fleet at Port Arthur, we can realise what serious risks would be encountered by any fleet attempting to bombard a fortress armed with these weapons. Even with the low velocity that would be obtained at long ranges, no armoured deck would be proof against such heavy shell falling almost vertically and filled with high explosive.

New British guns.

Full particulars have not yet been published of the new guns that are in course of manufacture for the Navy, and it is therefore impossible to discuss them in detail. It is, however, known that 50 calibre guns of 6-in., 7·5-in., and 9·2-in. calibre have been approved, and that the velocity of all these will be in the neighbourhood of 3000 f.s. The 3-pdr. semi-automatic, to which allusion has already been made, will have a velocity of 2800 f.s., an increase of 900 f.s. over that of the old pattern 3-pdr. which has been in use for so many years. It is not only in the power of the gun that improvements have taken place, but also in the simplicity and rapidity of working of breech mechanisms and loading-gear, all of which tend to increase the rate of fire and reduce the liability to damage on service. One of the most important developments for breech-loading guns in recent years was the introduction of the Welin breech-screw, which enabled a single motion mechanism to be used, and owing to its shortness enabled a great saving to be effected in the weight of the gun. Messrs. Vickers, Sons and Maxim have now further improved this mechanism by applying what they term a "pure couple" to turn the breech-screw, by which friction is reduced and power required to operate it materially lessened, a matter of some moment when we consider that a lever mechanism has been fitted to so large a gun as the 10-in. Some trouble was at first experienced with the obturator used with the Welin screw owing

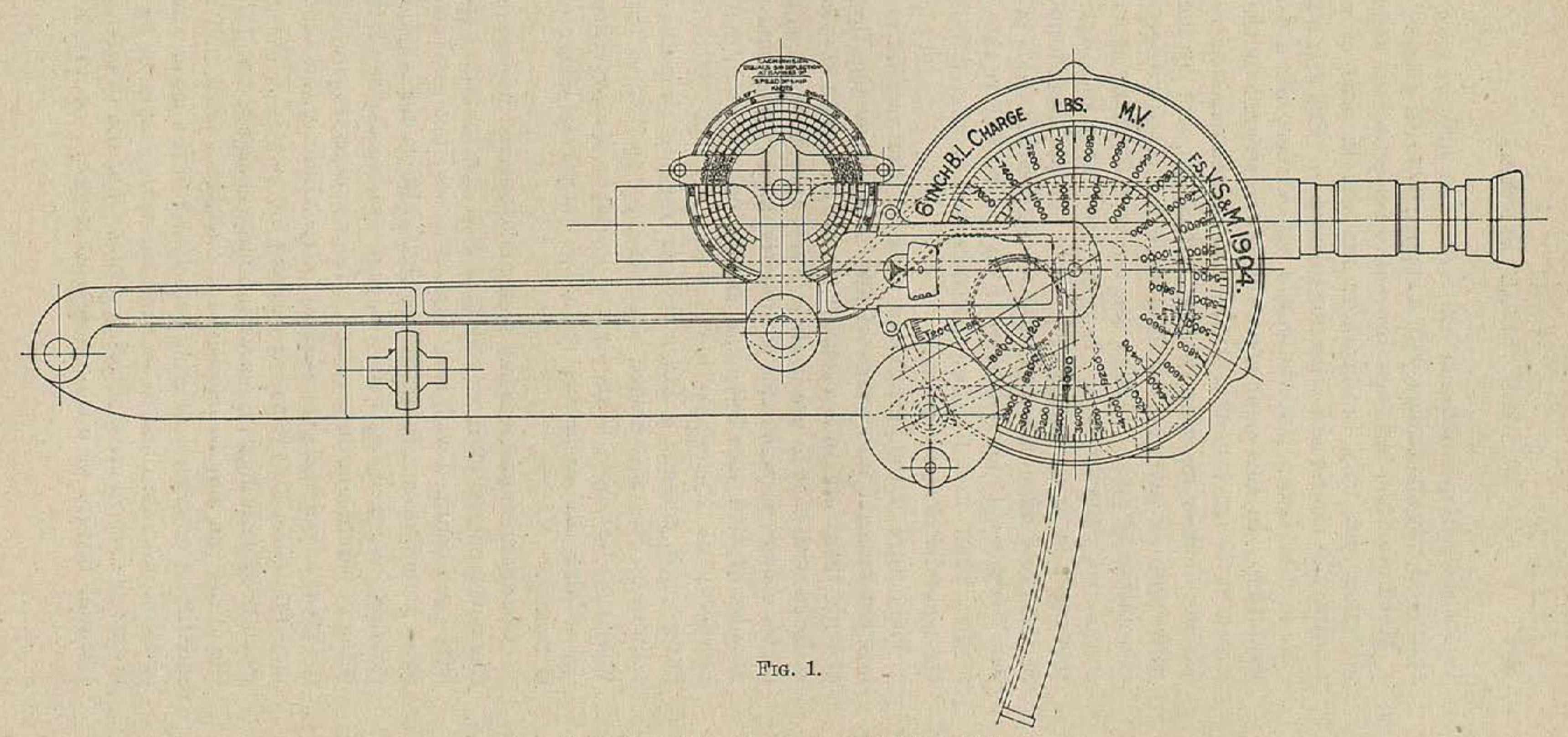


Fig. 1.

Vickers' sight for 6-in. gun on pedestal mounting.

to its steep slope, but this has now been remedied by the use of split steel rings combined with a copper protecting disc.

Sighting gear.

Much attention has been directed to perfecting the sighting gear of all guns, not only in accuracy, but also in ease of working and reading the ranges and deflections recorded. Fig. 1 is an example of one of the latest patterns made by Vickers for a 6-in. pedestal mounting. In this sight great rigidity is secured by the method by which it is fixed to the cradle, and accuracy has been obtained by various devices to entirely obviate backlash, and by the large dial with spiral range curve, enabling large readings to be given for small increments of range. When the necessity for firing at long ranges is considered, a good telescope is of the first importance, and the one on this sight is of an excellent pattern. It possesses a power varying from 21 to 7 magnifications, with corresponding fields of view of 1½ and 7 degrees, a high combination; a special feature that it possesses is that when once focussed the power can be altered at will without the necessity of re-focussing.

Propellants.

The nature of the propellants used by the various great Powers has experienced no change of any moment during the past year, though there are indications that the United States are far from satisfied with that in use in their Navy, and it is not at all unlikely that a change may be made at an early date. Smokeless propellants may be divided into two main classes, namely:—1: Nitro-cellulose powders; 2: Nitro-glycerine powders; though, of course, all the latter class contain a large though varying proportion of nitro-cellulose. The first-named is used by the United States Navy, Russia, and France; Germany also is said to be experimenting with it; whilst the second is used by ourselves, Italy, Japan, and Germany.

Nitro-cellulose powders.

Considerable progress has been made during the last few years in the development of nitro-cellulose powders, and very good results have been obtained with it in various forms; but good results on the proof ground do not fulfil all the desiderations for a good powder—stability and keeping qualities, and the regularity of its ballistics being of paramount importance. In one respect there is no doubt of the great advantage possessed by nitro-cellulose, and that is in the moderate effect that it has in wearing the bore of a heavy gun, even when fired with high pressures and large charges; but the prolonged life of the gun may be purchased at too high a price, and the want of stability of powders consisting principally of the lower nitrated forms of cellulose cause them to be regarded with suspicion by those who favour the addition of nitro-glycerine. For use in ordnance it is an essential feature of nitro-powders that they should be in a true

colloidal form, and impervious to the passage of flame at high pressure; and to obtain this condition the usual agents employed are either acetone or a mixture of ether and alcohol. The former has the disadvantage of leaving this class of powder brittle when dried, and the latter will only dissolve the less highly nitrated forms of cellulose; it is argued, however, that the solution of the soluble portion sufficiently protects the remainder, and the ether-alcohol mixture is the solvent usually employed. Much trouble has been experienced during the last year or two by the United States with their naval powder (the Army uses a powder containing 25 per cent. of nitro-glycerine), and, in addition to the stringent regulations which were noticed in these pages last year, it has been found advisable to institute a special establishment for the purpose of thoroughly investigating its properties and behaviour under varying conditions of treatment. By this means it has been ascertained that some of the batches of powder possess what are termed "critical points" in their pressure curves, or points beyond which the increase of pressure is not proportional to an increase of charge—if worked beyond this, excessive and dangerous pressures are likely to occur. On examination these powders showed greater brittleness than those of normal batches, and this has led to the introduction of a new clause into the specifications which imposes a physical test for toughness under compression; the terms of the heat test have also been made much more drastic.

Nitro-glycerine powders.

Nitro-glycerine, when added to nitro-cellulose, has the property of greatly increasing the energy, partly owing to its own inherent strength, and partly owing to its great heat of combustion. This latter property, though beneficial to the ballistics, in more fully expanding the gases formed, is deleterious to the gun, and, if the proportion is too large, has a great effect in washing away the metal of the bore at the breech end. The temperature of the nitro-glycerine flame is higher than the melting point of steel, with the consequence that a slight film of the metal is removed at each discharge. Nitro-cellulose, when alone, on the other hand, has a much lower temperature, and for this reason is practically innocuous. The effect depends very largely on the proportion of nitro-glycerine present, and it is due to the high percentage, 57 per cent., in cordite, that its erosive action is so great. Though cordite is eminently suited, on account of its excellent keeping qualities and the regularity of its ballistics, for storage and use in all varieties of climate, it was this defect that led to the introduction of M.D. cordite with only 30 per cent. nitro-glycerine. The reduced percentage does not seem to have had any detrimental result on its keeping qualities, and though it is too early

to say what its effect may be in prolonging the life of a gun, it is anticipated that the number of rounds that can be fired without serious reduction of velocity will be more than doubled. Varying the amount of the more powerful constituent has a great effect on the strength of the powder, and necessitates the use of larger charges for the same ballistics. This may be seen by comparing the two forms of cordite with a pure nitro-cellulose powder such as the American.

Nature of Gun.	Length of Gun in calibres.	Weight of Charge in lbs.	Nature of Propellant.	Muzzle Energy.	Work Realised per lb. of explosive.
12-in. British .	40	211	Cordite	ft.-tons. 36,280	172 ft.-tons
" " .	40	246	M.D. cordite	36,280	147 "
12-in. U.S.A. .	40	350	Nitro-cellulose	46,246	132 "
6-in. British . .	45	20	Cordite	4198	209 "
" " . .	45	29	M.D. cordite	5160	178 "
6-in. U.S.A. . .	49	46	Nitro-cellulose	5838	127 "

This Table also demonstrates the benefit of lengthening the gun when a slow-burning propellant is used, the amount of work per pound of powder, both with cordite and M.D. cordite, being considerably greater in the 45-cal. 6-in. gun than in the 40-cal. 12-in. Another point in favour of nitro-glycerine that should be mentioned is that it is to some extent a solvent of gun-cotton, and permits of the use of acetone, by which means the cost of production is lessened to about half that of nitro-cellulose powders.

"Flare-back."

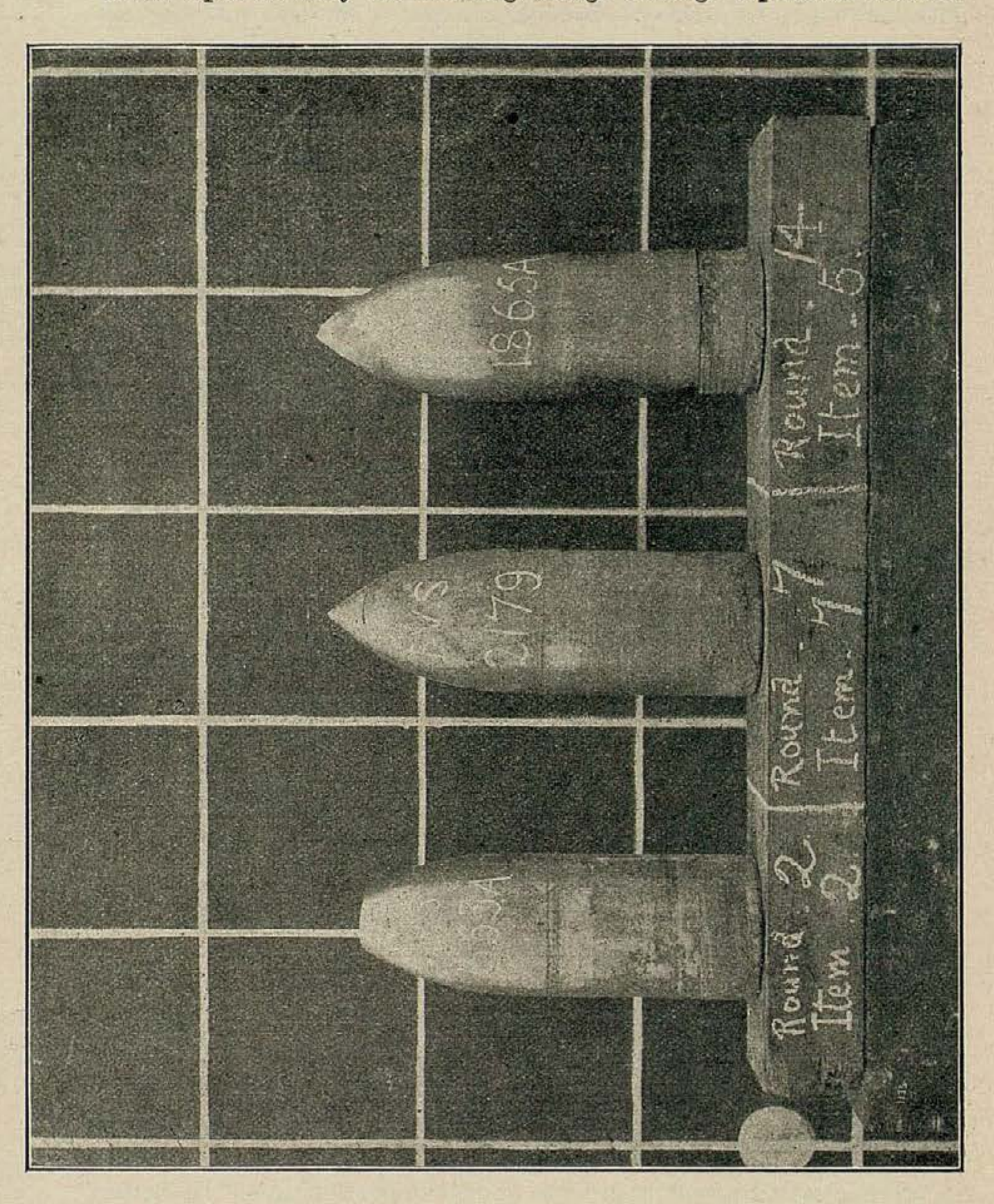
The question of "flare-back" when firing heavy guns is one that has attracted a good deal of attention of late in the United States, and its importance was emphasised last year by the terrible disaster on board the battleship Missouri. It has long been known that with smokeless propellants, after firing, a certain amount of inflammable gas is left in the bore at a sufficiently high temperature to ignite if brought into contact with air; and that if the breech is opened before this has time to cool, and the gun is firing to windward, the result may be a flash of flame to the rear. It is by no means certain that it was a flame of this nature that ignited the cartridges on the Missouri, but the probability has been considered sufficiently great to induce the United States naval authorities to experiment with various means for eliminating this possible source of danger. One of the methods tried consisted in raising the air pressure in the turret to a higher degree than that of the atmosphere outside, but this, though it is said to have achieved its object, had certain draw-

backs, and the method that has been preferred is the use of an air, or mixed air and steam, blast directed on the breech opening when withdrawing the breech-screw, which has proved perfectly efficient. It is believed that the provision of apparatus for this purpose has been approved, and that it is now being issued to all the ships of the Navy. Experience in this country rather tends to show that the effect of the flame is so evanescent that there is practically no danger of the ignition of a cartridge which is protected by a thick cloth bag. It is believed, however, that some experiments on much the same lines have been carried out in our own Navy. It is possible that the American cartridge-bags may not be an efficient protection, and one point that may have some bearing on the matter is that the powder being hard to light requires large igniters of black powder.

Austria, who has always been very catholic in her tastes with regard to explosives, has recently adopted a new powder for her lighter Q.F. guns, consisting of a mixture of ammonium and potassium nitrates with 15 per cent. of charcoal prepared from cellulose. It is said that the smoke produced is light and quickly dissipates, and that the ballistic qualities are good, but it does not seem to be adapted for heavier guns; it is, however, used for the bursting charges of the larger A.P. shell. The same country is also responsible for a totally new departure in explosives, in the shape of a powder called "Ammonal," made also from ammonium nitrate, but with powdered aluminium in place of charcoal. It depends for its explosive effect on the high temperature generated by the combustion of aluminium, which expands the gases formed to a very high degree. It is said to be as violent as picric acid when the percentage of aluminium is high, and that by reducing this its effect can be moderated to any desired amount. Though it is claimed for it that it will withstand the shock of hitting and breaking through thick armour better than other forms of high explosive, it appears to be much easier to ignite, and is not likely to be used with a base fuse. Other powders.

The improvements that have taken place during the last few years in the manufacture of projectiles have led in most countries to the substitution of armour-piercing shell for shot; Russia having taken the lead about six years ago, and having soon been followed by the other Continental powers and the United States. Given sufficient penetrating power, there can be little question as to the better projectile; but unfortunately until comparatively recently this country has been somewhat behindhand in this respect. Great progress has, however, been made in the last year or two, and now our best manufacturers have no difficulty in making shell that are equal if not superior to the best foreign productions. The result has A.P. Projectiles.

been that our Navy is now being supplied with a shell containing a bursting charge of from 2 to 2½ per cent. of its weight, that can be relied upon to carry its bursting charge through a plate of the best



Vickers' 7·5-in. semi-armour piercing shell after perforating a 7-in. K.C. plate.

K.C. armour its own calibre in thickness, and to be in a condition to explode on the other side; and this with the moderate velocity of under 2000 f.s. We reproduce a photograph of three semi-armour-piercing shell made by Messrs. Vickers and fired at their Eskmeals range in March of this year at a 7-in. K.C. plate, which is a good

representation of the excellent results that can now be obtained. The capacity of these shells is 5 lbs. of powder, equivalent to a 2½ per cent. bursting charge, and the following is the report of the trial:—

Round.	Weight and Nature of Projectile.	Striking Velocity.	Striking Energy.	Penetration.	Results.
		ft.-secs.	ft.-tons.		
2	Semi A.P. Shell 7·5 in. Weight, 200·1875 lbs. No. B.V.S./1653 A.	1961	5340	Through	Shell recovered whole with only piece of point broken off. There was a slight circumferential surface crack near the shoulder going about three-quarters of the way round.
7	Semi A.P. Shell 7·5 in. Weight, 200·25 lbs. No. B.V.S./2179	1974	5411	Through	Shell recovered whole with no cracks on it, but after a quarter of an hour a circumferential surface crack appeared, going about two-thirds round; and about 3¾ hours later the point cracked all round.
14	Semi A.P. Shell 7·5 in. Weight, 200·125 lbs. No. B.V.S./1865 A.	1957	5314	Through	Shell recovered whole. There was a slight circumferential crack running nearly all round near the shoulder, but this was only on the surface.

BRITISH RIFLED ORDNANCE.

Ordnance.										Charge (cordite).		Projectile.						Ballistics (with full charges).					
Nature.					Chamber.		Rifling.												Perforation of wrought iron.				
							Twist one turn in.																
Calibre or Pr.	Weight.	Mark and Service.*	Total length in inches.	Length of Bore, including Chamber.	Diameter (at largest).	Length to base of projectile.	Least at breech.	Greatest at muzzle.	System.†	Weight.	Size.	Diameter.	Weight.	Bursting Charge of Common Shell.	Value of $\frac{d^2}{w}$.	Value of $\frac{w}{d^2}$.	Muzzle velocity.	Total muzzle energy.	At muzzle.	At 1000 yards range.	At 2000 yards range.	At 3000 yards.	Perforation Krupp steel, 3000 yards. Uncapped Shot.
B.L. GUNS.				cals.	ins.	ins.	cals.	cals.		lbs. oz.		ins.	lbs.	lbs. oz.			f. s.	ft. tons.	ins.	ins.	ins.	ins.	ins.
16·25-in.	110½ tons.	I. II. & III.	524·0	30·0	21·125	84·5	newer patterns.	30	Modified Pl. Section, the last in the new guns.	960‡ S.B.C.	..	16·25	1800	‡‡193 / **179¼	0·147	0·420	2087	54,390	38·0	34·6	31·7	29·4	13
13·5-in.	69 & 67 tons.	I. II. III.& IV.	433·0	30·0	18·0	66·5		30		187 8	..	13·5	1250	**85	0·146	0·508	2016	35,230	33·0	30·2	27·6	25·2	11
12-in.	45 & 46 tons.	III. IV. V. & V.w	328·5	25·25	16·0	48·0		35		88 8	30	12·0	714	31$\frac{13}{16}$ / ‡‡95 / **79	0·202	0·413	1914	18,130	24·4	21·5	18·9	16·1	6
12-in.	46 tons.	VIII. Wire	445·5	35·43	16·0	70·0		30		167 8	50	12·0	850	80–1$\frac{9}{11}$	0·169	0·492	2367	33,020	37·0	32·7	29·4	26·6	11½
12-in.	50 tons.	IX. Wire	496·5	40·0	17.5	87·2		..		201 8 / 9 8	50 / 3¾	12·0	850	"	..	..	2481 / §2580	36,290 / 39,280	39·7 / 42·0	35·4 / 38·0	31·6 / 34·6	28·7 / 32·0	12½ / 14
10-in.	31 tons.	Triumph & Swiftsure	483·0	45·0	14·0	64·5		..		..	..	10·0	500	..	..	..	§2800	§27,205	39·5	34·6	30·2	27·0	11¾
10-in.	29 tons.	II. III. III.A & IV.	342·4	32·0	14·0	54·0		30		76 0	30	10·0	500	37¾	0·200	0·500	2040	14,430	24·8	21·8	19·3	17·0	7½
9·2-in.	21 & 22 tons.	I. & II.	255·8	25·56	11·0	44·0		35		42 0	30	9·2	380	18 / ‡‡33 / **30$\frac{6}{16}$	0·223	0·488	1781	8,356	18·3	15·9	14·4	12·4	5½
9·2-in.	24 & 22 tons.	III. V. VI. VI.A&C & VII.	310·0	31·5	12·0	43·0		30		53 8	30	9·2	380		0·223	0·488	2065	10,910	22·9	19·8	17·2	15·5	6¾
9·2-in.	25 tons.	Wire VIII.	384·0	40·08	10·5	53·15		..		63 0	40	9·2	380	..	0·223	0·488	2347	14,520	27·6	23·9	20·7	18·0	7¾
9·2-in	28 tons.	Wire X.	442·35	46·6	13·0	71·215	Various in the	..	P. Elswick, Hook, or	103 0	44	9·2	380	..	0·223	0·488	2640 / §2800	18,400 / 20,685	33·3 / 36·0	28·9 / 31·2	25·0 / 27·4	22·0 / 24·0	9½ / 10½
7·5-in.	16 tons.	Triumph & Swiftsure	386·7	50·0	..	46		..		..	..	..	200	♦..	0·281	0·474	§2800	10,883	29·0	24·9	21·4	17·8	7¾
7·5-in.	14 tons.	..	337·5	45	11·1	55		30		47 0 / 2 8	30 / 2½	7·5	200	18½	0·281	0·474	2600	9,340	26·0	22·3	18·8	15·7	6¾
6-in.	5 tons.	III.	170·7	25·53	8·0	26·75		35		14 12	20	6·0	100	7$\frac{4}{16}$ / **9$\frac{13}{16}$	0·360	0·463	1960	2,665	13·4	10·7	8·9	7·0	3
6-in.	5 tons.	IV. VI.	173·5	26·0	8·0	26·75		35 / 30				6·0											
6-in.	7·4 tons.	VII. VIII.	269·5	45	8·5	32·7		30		20 0	20	6·0	100	9	0·360	0·463	2493 / §2750	4,308 / 5,250	19·6 / 22·3	15·3 / 18·0	11.9 / 14·6	9·8 / 11·6	4¼ / 5
5-in.	38 cwt. / 40 cwt.	II. / III. IV. & V.	139·15	25·07 / 25·0	5·75	19·05		25		4 7½	7·5	5·0	50	7$\frac{13}{16}$ / 3$\frac{5}{16}$	0·500	0·400	1750	1,062	8·8	6·6	5·3	4·1	..
4-in.	23 cwt. / 26 cwt.	II.II.A III.III.A IV.V.& VI.	120·0	27·0	5·3	18·5	120	30		3 1	5	4·0	25	1$\frac{13}{16}$ / 3$\frac{3}{16}$	0·640	0·391	1900	625	7·7	5·4	4·0	3·0	..

* The Roman numeral is the number of the pattern given. Further differences in pattern are indicated by letters a, b, and c.
† P. means Polygroove; Pl., Plain; ‡ Cordite has not been introduced for this gun; § Estimated with M.D. Cordite; ** Cast steel; ‡‡ Forged steel.

BRITISH RIFLED ORDNANCE—*continued.*

Ordnance. Nature. Calibre or Pr.	Ordnance. Nature. Weight.	Ordnance. Mark and Service.	Ordnance. Total length in inches.	Ordnance. Length of Bore, including Chamber.	Chamber. Diameter.	Chamber. Length to base of projectile.	Rifling. Twist one turn in Least at breech.	Rifling. Twist one turn in Greatest at muzzle.	Rifling. System.*	Charge (full). Weight.	Charge (cordite). Weight.	Charge (cordite). Size.	Projectile. Diameter.	Projectile. Weight.	Projectile. Bursting Charge of Common Shell.	Projectile. Value of $\frac{d^2}{w}$.	Projectile. Value of $\frac{w}{d^3}$.	Projectile. Muzzle velocity.	Ballistics (with full charges). Total muzzle energy.	Ballistics. Muzzle energy per ton of gun.	Perforation of wrought iron. At muzzle.	Perforation. At 1000 yards range.	Perforation. At 2000 yards range.	Perforation. At 3000 yards range.
				cals.	ins.	ins.	cals.	cals.		lbs.	lbs. ozs.		ins.	lbs.	lbs.			f. s.	ft. tons.	ft. tons.	ins.	ins.	ins.	ins.
QUICK-FIRING GUNS (using metal cases)																								
6·0 in.	7 tons	I. & III. II. (Wire)	249·25	40	..	..	60	30	P.	..	13 4	30	6·0	100·0	..	0·360	0·463	2200	3356	479	15·9	12·7	10·2	8·2
6·0 in. Q.F.C.	5 „	I. to VI.	169·1 166·6	26·2 26·6	.. ..	.. ..	.. ..	.. ..										1913	2537	362	13·0	10·3	8·2	6·4
4·7 in.	41 cwt. 42 „	I. II. III. & IV. Wire	194·1	40	..	..	100 0	34·4 30	E.O.C.	..	5 7	20	4·72	45·0	..	0·495	0·428	2188	1494	711	12·4	9·2	6·6	5·0
4 in.	26 cwt.	I. II. III. Wire converted guns	165·25 120	40 28	..	..	..	30	M.Pl.	..	3 9	15	..	25 0	..	0·640	0·390	2300 2177	917 821	705 569	10·5 9·5	6·9 6·5	4·9 4·6	3·3 3·0
12-pr.	12 cwt.	I.	123·6	40	..	..	120 0	28 30	E.O.C. M.Pl.	..	1 15	10	3·0	12·5	..	0 667	0·500	2210	423	677	8·1	5·3	3·5	2·4
12-pr.	8 cwt.	I.	87·6	28	..	..	60 0	28 30	E.O.C. M.Pl.	..	13¾	10	3·0	12·5	..	0·667	0·500	1607	223·8	544	4·9	3·2	2·4	..
Hotchkiss . 6-pr...	8 cwt.	I. & II.	97·63	40·0	..	..	180	29·9	M.Pl.	..	b7¾	5	2·24	6·0	..	0·836	0·534	1818	137·5	344·8	4·8	2·8	..	..
Nordenfelt . 6-pr...	6 cwt.	I. II. & III.	104·4	42·3	..	..																		
Hotchkiss . 3-pr...	5 cwt.	I. & II.	80·63	40	..	..	25	25	M.Pl.	..	b6⅜	5	1·85	3·3	..	1·037	0·521	1873	80·3	321·2	4·1	2·1	..	..
Nordenfelt . 3-pr...	4 cwt.	I. L.	91·5	45·4									..	..	..	..	..	1920	84·3	337·2	4·3	2·2	..	..
MACHINE GUNS.										grains.				grs.										
Maxim, 1 bar 0·45 in.	63 lbs.	I.	45·0	..	..	..	10	27	Enfi'ld	31 Cordite	..	..	0·450	480	..	2·952	0·751	..	..	..	Same as M.H. Rifle.			
Maxim, ·303			42·38				10	25·6	Metf'd				0·303	215	..	..	..	..	..	..	Same as Lee-Metford.			

* P. means Polygroove; M.Pl., Modified plain.

b With 4 grs. R.F.G.

Note.—An armour-piercing shell has now come in for the 6-in. guns.

AUSTRIAN NAVAL ORDNANCE.

	Krupp Steel B.L. & Q.F. Guns.											
Designation by Calibre, in centimètres	30·5 L. 35 C. 80	24 cm. L. 40 C. 101	24 cm. L. 40 C. 94	24 L. 35 C. 86	19 L. 42 Skoda.	15 L. 40 C. 101	15 L. 40 C. 94	15 L. 35 C. 86	15 L. 35 C. 80	12 L. 40	12 L. 35 C. 80	12 L. 35 C. 87
Calibre, in inches	12·01	9·45	9·45	9·45	7·5	5·91	5·87	5·87	5·87	4·72	4·72	4·72
Length — Total, in feet	35·11	31·6	..	27·60	26·3	19·5	..	17·13	17·13	..	13·8	13·8
Length — Rifled Portion, in ins.	314·8	..	..	237·7	..	..	..	151·4	153·6	..	128·5	126·3
Length — Powder Chamber in ins.	69·9	..	..	65·2	..	..	..	37·3	35·4	..	24·0	26·3
Length — Of bore in calibres	35	37·2	37·4	35	40	37·2	37·0	35	35·0	37	35·0	35
No. of Grooves	68	..	..	25	..	..	..	36	36	..	32	32
Twist in calibres	45–25	..	..	26·9	..	..	..	45–25	25	..	25	25
Weight — Gun, tons	47·2	21·5	27·8	26·6	11·6	5·18	4·39	5·7	4·69	1·97	2·25	2·31
Weight — Breech Block, in lbs.	3306·9	..	..	1776·9	..	..	..	445·3	463·0	..	253·5	211·6
Weight — Steel Shell "	1003·1	474	474	474·0	198	112·5	100	112·5	86·0	52·4	57·3	57·3
Weight — Common Shell "	1003·1	474	474	474·0	..	112·5	100	112·5	69·9	52·4	57·3	57·3
Weight — Shrapnel Shell "	..	..	..	..	..	..	..	112·4	71·9	..	57·3	57·3
Weight of Bursting Charge — Case Shot "	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge — Steel Shell "	10·6	..	..	5·1	..	..	..	1·3	1·76	..	0·55	0·55
Weight of Bursting Charge — Common Shell "	97·7	..	..	17·9	..	..	..	5·29	3·86	..	2·2	2·2
Weight of Bursting Charge — Shrapnel Shell "	..	..	..	..	..	..	..	1·26	1·10	..	0·57	0·57
Weight of Firing Charge — Steel Projectile, in lbs.	156·5 24 cm.N	120·6	91·5	99·2N	56N	28·8	18·3	22·5 15 cm.N	38·8*	9·7	19·8 B	12·13N
Weight of Firing Charge — Common Shell, in lbs.	156·5 N 24 cm.N		91·5	99·2N			18·3	22·5 15 cm.N	38·8*		19·8 B	12·13N
Weight of Firing Charge — Shrapnel, in lbs.	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Firing Charge — Exercising, in lbs.	154·3B	..	..	..	..	..	..	28·7	19·6	..	11·0	6·6 N
Weight of Firing Charge — Saluting "	19·8 O	..	..	15·4O	..	..	..	4·74	4·74 O	..	2·4 O	2·4 O
Muzzle Velocity, in feet	1969	2595	2264	2100	2700	2608	2264	2133	1969	2264	1755	2133
Muzzle Energy — Total, foot-tons	26.970	22,121	16,845	14,500	10.025	5308	..	3549	2312	3554	1215	1808
Muzzle Energy — Per inch circumference, foot-tons	714·8	..	..	488·3	..	..	3554	192·5	125·4	..	82·5	122·2
Thickness of Iron, perforated inches at Muzzle, by Tresidder's formula	30·1	34·5	29·0	25·8	27·3	22·0	17·0	16·1	12·6	13·7	9·7	12·9
Perforation of Krupp Steel, 3000 yds., inches	10	9½	8	7	6¾	5	3½	3½	..	..	..	..

NOTE.—C for cube powder; * prismatic powder; O, ordinary powder; B, brown prismatic. N, nitro-glycerine smokeless powder.
There are also Q.F. Skoda 7-cm., Skoda and Hotchkiss 47-mm., another 47-mm. and Hotchkiss 37-mm.

DANISH NAVAL ORDNANCE.

Krupp B.L. Guns designated.

Designation by Calibre	35·5 cm.	30·5 cm.	26 cm. long.	26 cm. short.	24 cm.	24 cm.	21 cm.	15 cm.	15 cm. long.	15 cm. medium.	15 cm. short.	12 cm. long.	12 cm.	8·7 cm.
Calibre, in inches	13·98	12·01	10·24	10·24	9·4	9·4	8·24	5·9	5·91	5·91	5·91	4·72	4·72	3·43
Total length, in feet	29·1	22·0	32·8	18·77	31·4	31·6	24·04	..	17·1	12·63	10·7	11·8	..	11·5
Length of Bore, including Powder Chamber, in inches	304·7	227·2	327·6	194·5	..	..	264·5	..	190·3	135·0	112·9	128·8	..	..
Length of Bore, including Powder Chamber, in calibres	21·8	18·9	32·0	19·0	37	37·5	35	40	32·2	22·8	19·1	27·3	37·5	37·1
Number of Grooves	80	68	60	60	..	..	48	..	36	36	36	32	..	..
Twist of Rifling, in calibres	45	45	70–25	45	..	..	70–25	..	70–25	45	45	25	..	..
Total weight, including Breech-gear, tons	51·3	35·4	27·6	21·6	25·4	22·9	13·3	..	4·7	4·4	3·5	2·13	..	..
Weight of Breech Block, lbs.	4695·8	2910	2006	1940	..	..	903·9	..	390·2	330·7	324·1	229·2	..	..
Weight of Steel Shell, "	1157·4	725·3	451·9	451·9	353	353	238·1	112	112·4	..	86·0	..	44	..
Weight of Chilled Shell, "	1157·4	725·3	..	451·9	..	..	..	..	..	86·0	86·0	..	..	..
Weight of Common Shell, "	1157·4	725·3	451·9	451·9	230	353	238·1	112	112·4	69·4	69·4	57·3	44	20
Weight of Shrapnel Shell, "	1157·4	725·3	451·9	451·9	..	..	238·1	..	112·4	86·0	86·0	57·3	..	..
Weight of Case Shot, "	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Weight of Bursting Charge, Common Shell, "	57·3	39·7	25·4	25·4	16·5	16·5	12·8	6·2	6·2	3·0	3·0	1·7	..	..
Weight of Firing Charge, Steel or Chilled Shell, lbs.	330·7	180·2	191·8	101·4	..	75*	105·8	20·9*	41·9	19·3	21·8	17·4	9·7*	3·59*
Weight of Firing Charge, Common Shell, "	330·7	180·2	191·8	112·4	..	75*	105·8	..	41·9	19·3	21·8	17·4	..	..
Muzzle Velocity, Armour-piercing Projectile, feet	1762	1675	2018	1640	2159	2362	2021	2264	1800	1565	1542	..	2460	2379
Muzzle Velocity, Common Shell, "	1762	1675	2018	1640	..	..	2021	..	1890	1683	1690	1720	..	..
Muzzle Energy, Total foot-tons	24910	14110	12770	8428	11,440	13,656	6745	3981	2784	1461	1418	..	1846	780
Muzzle Energy, Per inch circumference, foot-tons	568·3	374·1	396·8	262·0	..	..	260·6	..	150·0	78·7	73·0	..	..	..
Perforation at Muzzle, wrought iron, Tresidder's formula	25·6	20·1	22·9	16·8	23·3	26·7	18·5	17·8	15·6	12·6	..	..	14·2	10·7
Perforation Krupp Steel, 3000 yards, inches	7	5½	6	4¾	6	7	5	3½	3	..	..	..	..	..

NOTE.—Chilled projectiles will gradually be replaced by steel.

* Smokeless powder.

There is also a 44-calibre 5-pr. Hotchkiss, V. = 2362 f.s.

DUTCH NAVAL ORDNANCE.

	Krupp Breech Loading Q.F.											Dutch Breech Loading.
Designation by Calibre, in centimètres	28	24	21	21	21	No. 2.	15	15	12	12	12	12*l*
Calibre, in inches	11·0	9·4	7·91	8·2	8·2	5·87	5·9	5·9	4·72	4·72	4·72	4·72
Total Length, in feet	27·5	31·6	24·04	24·0	27·5	17·13	17·1	19·7	13·9	15·9	13·78	13·78
Length of Rifled Portion of Bore, in inches	..	..	222·2	..	..	151·4	..	..	..	..	128·5	..
Length of Powder Chamber "	..	..	42·4	..	..	37·7	..	..	..	..	24·0	..
Length of Bore, in Calibres	27	37	35	32	37·1	35	32	37	32·3	37·3	35	35
Number of Grooves	..	..	48/64	..	..	44	..	..	..	..	32	32
Depth of Grooves, inches	..	..	0·059	..	..	..	..	..	..	..	..	0·06
Twist of Rifling, in Calibres	..	..	∝–25	..	..	25	..	..	..	..	25	∝–45
Total Weight, in tons	27	25·3	12·79 / 13·98	14·0	16·2	4·72	3·8	4·7	1·9	2·7	2·26	2·31
Firing Charge { Armour-piercing Projectile, in lbs.	185	..	99·2	119	..	49·6	15·4	18·5	..	..	19·8	19·5
Firing Charge { Common Shell "	..	..	99·2	..	..	49·6	..	..	..	..	19·8	19·8
Weight { Armour-piercing Projectile "	761	474	308·6	309	309	112·2	100	88·2	52·4	57·4	57·3	57·3
Weight { Common Shell "	..	..	308·6	..	..	112·2	..	..	..	..	57·3	57·3
Weight { Case Shot "	..	..	..	..	..	..	..	..	..	..	57·3	..
Bursting Charge { Armour-piercing Projectile "	..	..	4·6	..	..	..	..	..	..	..	..	..
Bursting Charge { Common Shell "	20	..	12·3	..	..	..	..	..	..	..	..	..
Muzzle Velocity, feet	1627	2562	1739	1903	2067	2001	2034	2461	2034	2067	1755	1804
Muzzle Energy { Total, in foot-tons	13,960	21,589	6471	7760	9756	3115	2867	3703	1503	1689	1224	1264
Muzzle Energy { Per inch Circumference, foot-tons	..	..	260·7	..	..	169·0	..	..	..	..	82·5	85·2
Perforation at Muzzle, in inches	20·0	34·0	{16·8 / 17·1}	19·4	21·9	{13·6 / 14·8}	14·3	17·9	11·6	12·4	{9·4 / 10·1}	9·6
Perforation Krupp Steel, 3000 yards	5½	9½	3½	4½	5	..	..	..	..	..	..	..

Smokeless powder is used, but the weight of charge is not known.

FRENCH NAVAL ORDNANCE.

Date and Pattern of Gun.	Model 1902.	Model 1893–96.				Model 1893.					Model 1887.				1884.					1881.						
Desig. by Calibre, in cms.	30·5	30·5	27·44	24·0	19·4	34·0	30·5	27·44	24·0	19·4	34	30·5	27	19	34	27	24	16	14	34 long.	34 short.	27	24	16 heavy.	16 light.	14
Calibre, in inches	12·01	12·01	10·8	9·45	7·64	13·39	12·0	10·8	9·45	7·64	13·39	12·0	10·80	7·64	13·39	10·80	9·45	6·49	5·45	13·39	13·39	10·8	9·45	6·49	6·49	5·46
Total length, in feet	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	28·47	24·89	17·04	..	33·69	25·32	27·12	23·70	15·14	15·14	14·3
Length of Bore, in ins.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	380·6	280·2	306·9	269·3	180·9	180·9	162·6
Length of Bore, in cals.	45	45	45	40	40	35	40	45	40	40	42	45	45	45	30	30	30	30	30	28·5	21·0	28·5	28·5	28	28	28
Number of Grooves	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	50	50	42
Depth of Grooves, inches	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	0·067	0·067	0·059	0·055	0·039	0·039	0·035
Rifling Twist	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	7°	7°	7°	7°	7°	7°	7°
Total weight, in tons	..	44·4	34·5	23·6	12·5	52·9	45·9	34·9	22·4	10·6	60·0	49·2	37·1	10·6	50·8	27·7	17·9	5·4	3·15	52·2	47·2	27·4	17·7	4·9	3·9	3·2
Weight of Firing Charge: Armour-piercing Projectile, lbs.	..	246	188·5	145½	74	243·0	198·4	114·6	110·2	44·1	220·5	198·4	114·6	44·1	388·0	200·6	..	42·5	..	388·0	337·3	203·9	149·9	42·5	32·6	..
Weight of Firing Charge: Com. Shell lbs.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	200·6	..	42·5	27·1	337·3	368·2	203·9	149·9	42·5	32·6	27·1
Weight: Armour-piercing Projectile* lbs.	750	750	562	375	190	925·9	643·8	476·2	317·5	165·3	925·9	643·8	476·2	165·3	925·9	476·2	317·5	99·2	..	925·9	925·9	476·2	317·5	99·2	99·2	..
Weight: Com. Shell "	..	644	476	317	165	..	..	..	..	..	..	..	..	..	771·6	396·8	264·6	99·2	66·1	771·6	771·6	396·8	264·6	99·2	99·2	66·1
Weight: Case Shot "	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	130·7	130·7	61·7
Muzzle Velocity, in f.-s., A.P. Projectile	2870	2650	2650	2870	2870	2400	2625	2625	2625	2625	2560	2625	2625	2625	1969	1969	1969	1969	1969	1969	1804	1939	1969	1969	1821	1936
Muzzle Energy: Total, in f.-t.	42890	36782	27186	21445	10890	36850	30750	22750	15170	7898	42040	30750	22750	7898	24900	12800	8539	2668	1777	24900	20880	12800	8539	2668	2080	..
Muzzle Energy: Per in. circ., f.-t.	..	..	..	..	..	..	815·8	670·7	511·1	329·1	..	815·8	670·7	329·1	591·9	377·5	287·7	130·8	103·9	591·9	496·6	377·5	287·7	130·9	121·3	..
Perforation at Muzzle† wrought iron, inches.	46·0	42·7	38·8	37·0	29·0	36·8	37·3	33·7	29·4	23·4	40·8	37·3	33·7	23·4	27·6	22·0	19·2	13·0	10·7	27·6	24·2	22·0	19·2	13·0	11·6	..
Perforation Krupp Steel 3,000 yds.	15½	13½	11½	10½	6¾	11½	11	9	7½	5½	13	11	9	5½	7½	6	5¼	3	..	7½	7	6	5¼	3	..	..

* Steel or chilled iron. † By Tresidder's formula.
Some 50-calibre 24-cm. and 19·4-cm. are being made. The velocity will be about 3000 f.s.

FRENCH NAVAL ORDNANCE—*continued.*

Date and Pattern of Gun.	16·47.	Q.F. Guns. 16·47	16§	16‡	14§	14	Mod. 92. 10	Mod. 91. 10	Mod. 81. 10‡
Desig. by Calibre, in cms.	16·47	16·47			13·86		10·00		
Calibre, in inches	6·46	6·46			5·44		3·94		
Total length, in feet	26·9								
Length of Bore, in inches	..								
Length of Bore, in calibres	47·5	45	45	30	45	30	60	50	26
Number of Grooves	..								
Depth of Grooves, inches	..								
Rifling Twist	..								
Total weight, in tons	8·5*	8·1	6·89	4·92	4·13	3·84	2·19	1·62	1·18
Weight of Firing Charge: Armour-piercing Projectile * . lbs.	..	44	30·2	19·0	16·1	12·8	8·16	8·16	5·07
Weight of Firing Charge: Common Shell . "	..								
Weight: Armour-piercing Projectile . lbs.	115	115	99·21		66·14		30·87		
Weight: Common Shell . "	..								
Weight: Case Shot . "	..								
Muzzle Velocity, in ft.-secs.	3000*	2870	§2625	2100	2625	2100	2500	2428	1840
Muzzle Energy: Total, in foot-tons	7185	6568	4730	3061	3160	2022	1340	1266	725
Muzzle Energy: Per in. circ. foot-tons	..	..	233·5	150·9	184·9	118·7	..	..	..
Perforation at Muzzle, wrought iron, inches	26·3	24·5†	20·0†	14·4†	17·7†	12·7†	13·0†	12·5†	8·2†
Perforation Krupp steel, 3,000 yards	5¾	5¼	4	..	..	..	..	..	..

* Estimated. † By Tresidder's formula. ‡ Models 1881 and 1884 converted guns.
§ There are three models of the years 1887, 1891 and 1893, of slightly different weights from the above.

GERMAN NAVAL ORDNANCE.

Krupp Steel Breech-loading Guns, designated by calibre.

		30·5 jack'd.	28	28	26 long.	26 jack'd.	26 short.	24 Q.F.	24 long.	24 long.	21 Q.F.	17	15 Q.F.	15 Q.F.	10·5 Q.F.	10·5 Q.F.	12·5 hoop'd.	10·5 long.	8·8	6
Designation in centimètres		30·5 jack'd.	28	28	26 long.	26 jack'd.	26 short.	24 Q.F.	24 long.	24 long.	21 Q.F.	17	15 Q.F.	15 Q.F.	10·5 Q.F.	10·5 Q.F.	12·5 hoop'd.	10·5 long.	8·8	6
Calibre, in inches		12·01	11·02	11·02	10·33	10·33	10·33	9·45	9·45	9·45	8·2	6·7	5·9	5·9	4·13	4·13	4·92	3·96	3·42	2·36
Length	Total, in feet	21·98	36·75	32·15	18·77	18·77	17·06	31·50	27·56	23·63	27·4	22·3	17·6	19·7	12·1	13·9	9·60	12·08	11·3	4·1
	Rifled portion, in ins.	181·9	407·9	352·8	149·8	150·0	129·3	349·6	302·4	201·6	..	..	..	..	..	..	85·7	113·6	..	44·3
	Powder Chamber „	45·3			44·7	44·4	44·7	..	..	53·5	..	..	..	..	..	..	16·7	19·5	..	..
	Bore, in calibres	18·9	40	35	18·8	18·8	16·8	37·4	32·0	26·1	37·0	37·7	32·2	37·0	32·2	37·2	20·8	33·6	37·2	..
Number of Grooves		72	..	..	36	48	36	..	..	56	..	..	..	..	..	..	32	32	..	24
Depth of Grooves, in inches		0·079	..	..	0·077	0·079	0·077	..	..	0·059	..	..	..	..	..	..	0·059	0·049	..	..
Twist, in calibres		45	..	..	50	50	50	..	..	25	..	..	..	..	..	..	40	25	..	..
Weight	Gun, including Breech Gear, tons	35·4	43·4	43·2	21·7	18·7	17·7	25·4	21·7	18·7	14·0	7·8	4·4	5·4	1·25	2·28	1·38	1·15	..	0·10
	Breech Block, in lbs.	2954	..	..	2050	1973	1973	..	..	..	..	..	..	..	..	..	163·1	149·9	..	..
	Armour - piercing projectile, in lbs.	725·3	562·2	562·2	412·3	412·3	412·3	474·0	474·0	474·0	309	..	88	88	40	40	..	..	2·18	..
	Common Shell, in lbs.	725·3	595·0	474·0	357·1	357·1	357·1	474·0	474·0	474·0	309	154	..	..	..	..	40·1	39·7	..	6·61
Weight of Bursting Charge	Armour - piercing Shell, in lbs.	7·7	..	..	5·3	5·3	5·3	7·05	7·05	6·6	4·4	154	..	..	..	..	..	..	..	..
	Common Shell, in lbs.	19·8	25·4	25·4	14·3	14·3	22·0	16·5	16·5	15·4	11·1	..	..	..	..	..	2·4	0·9	..	..
Weight of Firing Charge	Armour - piercing Shell, in lbs.	202·8	198·0§	297·6	105·8	105·8	125·7	89·3	152	152·1	60·2	..	13·5	18·7	4·8	..	..	..	..	..
Initial Velocity	Armour - piercing projectile, ft.-secs.	1713	2700§	2133	1588	1588	1578	2296	1803	1657	2360	44	2034	2560	2034	2349	..	..	2400§	..
	Common shell, ft.-secs.	1713	..	..	1641	1641	1654	..	..	1657	..	2700	..	..	..	..	1545	1526	..	1545
Muzzle Energy	Total, foot-tons	14,750	30,000§	17,740	7211	7211	7119	17,330	10,683	9024	11,934	..	2525	4003	1119	1530	..	..	720	..
	Per in. circ., ft.-tons	391	..	512·4	223	223	220	..	401·2	304	..	7795	..	..	..	..	..	..	..	..
Perforation at Muzzle, by Tresidder's formula		20·8	39·0	26·7	15·1	15·1	15·0	29·7	20·7	18·0	26·7	25·5	13·4	19·0	10·8	13·3	..	..	10·0	..
Perforation Krupp Steel, 3000 yards, inches		5¾	11½	7¼	..	..	..	8½	5¾	5¼	6½	5¾	..	4	..	..	..	..	..	..

§ Estimated.

ITALIAN NAVAL ORDNANCE.

	Armstrong Breech Loading.					Q.F.	Armstrong B.L.	Armstrong Quick-Firing.					
Designation by Calibre, in centimètres	43·1†	43·1† Early Pattern. 1882.	34·3	30·5	25·4	20·3	15·2	15·2	15·2	15·2	12·0	12·0	7·6
Calibre, in inches	17	17	13·5	12	10	8	6	6	6	6	4·7	4·7	3·0
Length: Total, in feet	40 75	39	36·09	..	34·8	..	16·9	17·0	20·9	20·9	16·2	13·0	..
Length: Rifled Bore, in inches	346·8	315·7	..	..	..	..	..	..	..	..	} 189	..	..
Length: Powder Chamber, in inches	84·5	98	..	..	..	..	..	..	..	..		..	..
Length: Bore, in Calibres	27	26	..	40	40	45	32	33·0	40	40	40	35	40
No. of Grooves	82	82	56	..	..	..	..	..	..	..	22	22	..
Twist of Rifling, in Calibres	50	50	..	..	..	..	..	..	..	..	34·4	..	..
Total Weight, in tons	104·3	101·5	67·9	..	30	..	5·4	5·1	5·7	6·5	2·05	1·69	0·6
Firing Charge: Armour-piercing projectile, lbs.	900·0	725	630·5	..	..	..	46	46	46	17·6*	..	..	..
Firing Charge: Common Shell, "	600	480	..	..	..	..	..	.	..	..	..	..	..
Weight: Armour-piercing projectile, "	2000	2000	1250	850	448	250	98	98	100	100	45·0	36·0	12
Weight: Common Shell, "	2000	2000	1250	..	..	..	..	..	..	..	..	36·2	..
Weight: Shrapnel "	2017	2017	1250	..	..	..	..	..	..	..	..	29·8	..
Weight: Case Shot "	..	..	..	..	..	..	..	..	..	..	..	..	..
Bursting Charge: Armour-piercing projectile, "	32	32	17 4	..	..	..	2·0	2·0	5·1	4·4	..	1·83	..
Bursting Charge: Common Shell, "	60	60	87·1	..	..	..	..	..	..	..	..	3·02	..
Bursting Charge: Shrapnel "	5	5	4·25	..	..	..	..	..	..	..	..	0·35	..
Muzzle Velocity, in ft.-secs.	1992	1935	2016	2500	2460	2600	1952	1985	2149	2297	2180	..	2625
Muzzle Energy: Total, foot-tons	55,030	51,930	35,230	36,925	18,798	11,730	2577	2705	3169	3622	1490	..	573
Muzzle Energy: Per inch circumference, foot-tons	1035	976·3	830·8	..	..	..	..	..	..	..	..	..	..
Perforation at Muzzle, inches of iron by Tresidder's formula	36·7	35·0	33·0	40·0	31·0	28·3	13·2	13·6	15·4	17·0	12·4	..	10·2
Perforation Krupp Steel, 3000 yds., inches	12½	12	11	13	9	7	..	..	..	3½	..	..	..

* Ballistite. † There are four types of these guns, viz.—Lauria, Lepanto, Italia, Morosini.

Note.—There is also a 6-inch quick-firing gun, 40 cals. M.V., 2600 f.s.

The weight of Ballistite charges is not known, but it is understood that they give the same ballistics as the powder charges shown.

RUSSIAN NAVAL ORDNANCE.

	Obukhoff Steel Breech Loading Hooped Guns.				Steel B.L. Guns.		
Designation by Calibre, in inches	12	9	8	6 Long.	4·2 9-pdr.	3·43 Long. 4-pdr.	3·43 4-pdr.
Calibre in centimètres	30·48	22·86	20·32	15·24	10 67	8·70	8·70
Total Length, in feet	35	26·25	23·33	17·5	7·0	6·9	5·8
Length of Rifled Portion of Bore, in inches	..	..	..	..	65·0	62·6	53·0
Length of Powder Chamber, in inches	..	..	..	..	8·0	10·7	..
Length of Bore in Calibres, including Powder Chamber	31·9	35	35	35	17·4	21·4	..
Number of Grooves	..	..	..	..	16	24	12
Depth of Grooves in ins.	..	..	..	..	0·055	0·050	0·050
Twist of Rifling in cals.	..	..	..	..	50	40	41
Total Weight, in tons	55·7	19·44	13·64	6·26	0·87	0·45	0·35
Weight of Steel Shell, in lbs.	731	..	..	..	..	..	..
Weight of Chilled Shell, "	..	..	..	..	..	..	..
Weight of Common Shell, "	..	268·2	192·3	73·35	24·2	15·2	12·6
Weight of Case Shot, "	..	..	..	..	22·3	15·2	11·0
Weight of Firing Charge Steel Shell, "	338	..	..	89·38	..	..	..
Weight of Firing Charge Chilled Shell, "	..	..	..	39·6	..	..	..
Weight of Firing Charge Common Shell, "	..	180	88·2	39·6	2·6	3·1	1·3
Muzzle Velocity, in feet	2090	2376	1925	2080	..	1444	..
Muzzle Energy Total, foot-tons	22130	10,500	..	2682	..	..	..
Muzzle Energy Per Inch Circumference, foot-tons	587·1	371·4	..	142·3	..	..	..
Perforation at Muzzle, in inches	..	20·2	..	12·50	..	..	..
Perforation at Muzzle, by Tresidder's formula	28·3	24·0	15·7	..	..	..	..
Perforation Krupp Steel, 3000 yds., inches	8	6	..	..	..	..	..

There exist also 15 and 10·7 cm. Krupp guns.

NEW PATTERN RUSSIAN NAVAL GUNS.

The following guns are in use in the Russian Navy, the ballistics being somewhat as under:—

	12-in.	10-in.	9-in.	8-in.
Weight	59 tons	32 tons	..	..
Length	40 cals.	45 cals.	45 cals	45 cals.
Projectile	720 lbs	488 lbs	403 lb.	188 lbs
Muzzle Velocity	2600f.s	2600f.s	2500f.s	2800f.s
Perf. Wt. Ir. Muzzle	38 ins.	35 ins.	32 ins.	27 ins.
Perf. Wt. Ir. 2000 yds.	30 "	27 "	24 "	20 "
Perf. K.S. 3000 yds.	12 "	10½ "	8½ "	6½ "

Q.F. GUNS.

	6-in.	4·7-in.	12-pdr.
Length	45 cals.	45 cals.	50 cals.
Projectile	89 lbs.	46 lbs.	12 lbs.
Muzzle Velocity	2900 f.s.	2600 f.s.	2700 f.s.
Perf. Wt. Ir. Muzzle	22½ ins.	15½ ins.	10·2 ins.
Perf. Wt. Ir. 2000 yds.	13 "	9 "	4·8 "
Perf. K.S. 3000 yds.	4¾ "	..	..

SPANISH NAVAL ORDNANCE.

	Hontoria, Pattern 83.								Armstrong, Pattern 83.			Armstrong.			Krupp.							
	Breech Loading.											Muzzle Loading.		Pattrn. 81 B.L.	Breech Loading.		Q.F. guns.					
Designation by Calibre	32-cm.	28-cm.	24-cm.	20-cm.	18-cm	16-cm.	14-cm.	12 cm.	12-cm.	8·7-cm.	7·5-cm. long.	22·86-cm	20·3-cm	6-in.	15-cm.	12-cm.	15-cm.	14-cm.	12-cm.	75-mm.	57-mm.	47mm.
Calibre, in inches	12·60	11·02	9·45	7·87	7·09	6·34	5·51	4·72	4·72	3·4	2·95	9·00	8·00	6·00	5·87	4·72	5·9	5·51	4·72	2·95	2·24	·85
Length: Total length, in feet	38·7	33·8	29·0	..	21·75	19·3	16·91	14·5	13·75	7·9	7·50	13·0	11·0	14·5	17·13	11·81	19·6	20·7	..	..	..	..
Length: Rifled Portion, in inches	352·4	309·1	..	..	..	170·6	149·1	126·0	135·8	75·0	70·7	104·0	102·0	126·9	..	..	..	..	..	..	..	..
Length: Powder Chamber, in inches	86·8	77·1	..	..	..	49·8	53·9	39·4	19	13	13	..	..	29·7	..	..	..	..	..	..	..	..
Length: Bore, in calibres	35	35	30	..	30	35	35	35	33	27	28·7	14	14·75	26·1	35	30	37	45	45	40	42	40
No. of Grooves	80	70	60	50	45	40	35	30	22	20	18	6	4	28	36	32	..	..	..	..	..	..
Depth of Grooves, in ins.	0·06	0·06	0·05	0·06	0·04	0·04	0·04	0·04	0·03	0·03	0·03	0·18	0·18	..	0·06	0·06	..	..	..	..	..	..
Twist of Rifling, in cals.	From 0 to 30.								40	30	35	45	40	100 to 40	25	25	..	..	..	..	..	..
Total Weight, in tons	47·3	32·5	20·7	11·5	8·71	6·1	4·1	2·6	2·2	0·45	0·35	12·0	9·0	4·0	4·7	2·1	4·39	4·8	2·65	0·9	0·34	0·23
Weight: Armourpiercing projectile, in lbs.	1041	694·3	438·7	253·5	187·4	130·1	86·0	53·1	39·2	..	..	250·0	180·0	78·3	84·9	43·65	100	70	55	14	6	3·3
Weight: Common Shell, in lbs.	879·6	586·4	370·4	213·8	..	112·4	75·0	47·2	36·4	14·1	11·5	250·0	180·0	73·6	65·5	34·61	..	..	..	..	..	..
Weight: Ring Segment, in lbs.	886·3	590·8	370·4	211·6	..	112·4	75·0	47·6	38·6	15·4	11·7	..	..	83·6	..	34·61	..	..	..	..	..	..
Firing Charge: Armour-piercing projectile, in lbs.	485·0	352·7	220·5	112·4	94·8	66·1	44·1	28·7	16·0	..	..	50·0	35·0	34·0	37·48	19·29	..	..	15·4	7·1	1·93	..
Firing Charge: Other projectiles	463·0	319·7	220·5	..	..	61·7	..	28·7	11·9	4·0	4·0	33·0	21·0	24·9	25·4	..	..	..	..	..	..	..
Muzzle Velocity, in feet	2034	2034	2034	2034	2034	2054	2001	1988	2000	1625	1709	1339	1339	1929	2001	1887	2264	2460	2423	2100	1870	2330
Muzzle Energy: Total, in ft.-tons	29850	24030	12580	7271	5374	3806	2386	1511	1087	258	233	3105	2239	2018	2357	1076	3554	2936	2238	428	145	124
Perforation at Muzzle, in inches	32·9	28·7	24·6	20·5	18·6	16·6	13·9	11·6	9·3	..	..	10·6	9·6	11·0	12·7	9·7	17·0	16·5	15·5	7·9	5·0	5·7
Perforation Krupp Steel, 3000 yards	11	8	6¼	4¾	4¼	3½	..	..														

Note.—The Carlos V. has 11-in. 45 cal. guns. M.V. probably 2500 f.s.

NAVAL ORDNANCE OF SWEDEN AND NORWAY.

	Sweden.										Norway.								
	Armstrong.					Bofors.	New Pattern Q.F.		M. 85.	M. 89.	Modern Guns.								
Designation by Calibre, in cms.	15·2	25	25	25	24	21	15 Q.F.	12 Q.F	25	15	21	21 Q.F.	21 Q.F.	15	15 Q.F.	12 Q.F.	12 Q.F.	76mm.	7cm.
Calibre, inches	6·0	10	10	10*	9·45	8·2	5·9	4·7	10·00	6·0	8·24	8·0	8·24	5·9	..	4·7	4·7	3·0	2·8
Total Length, feet	..	33·4	29·5	28·6	27·0	30·7	22·2	17·9	28·33	16·98	24·0	27·9	31·3	19·6	..	..	..	..	..
Length: Rifled Portion of Bore, ins.	..	..	..	..	..	..	..	..	260·9	155·2	..	..	..	..	..	..	..	..	..
Length: Chamber, "	..	..	..	..	..	..	..	..	58·1	35·2	..	..	..	..	..	..	..	..	..
Length: Bore in calibres, "	50	40	32	35	32·4	43	43	43·3	32·9	32	32	40	43·8	37·1	43·8	45	43·9	40	38
Number of Grooves	..	..	..	..	..	..	..	..	42	28	..	..	..	..	..	..	..	..	..
Twist of Rifling	..	..	..	..	..	..	..	..	40	30	..	..	..	..	..	..	..	..	..
Total Weight, tons	7·8	30*	29·5	28·6	23·5	16·3	5·8	2·7	29·8	5·2	13·9	15·5	18·7	5·6	..	3·1	2·65	0·6	0·63
Weight of Armour-piercing Shell in lbs.	100	450	450	450	400	309	100	46	449·7	100	309	210	309	112	..	46	45	12·5	10·3
Weight of Common Shell, in lbs.	..	..	401	401	..	..	..	..	401·2	100	..	..	..	..	..	..	..	..	..
Weight of Firing Charge: Armour-piercing Shell, in lbs.	37·5	160†	242	†	182	..	18	9·15	242·5	54·0	115	32	47	58·4	..	6·6	8·4	1·7	1·9
Weight of Firing Charge: Common Shell, lbs.	..	..	..	..	..	..	..	..	242·5	..	..	..	..	..	..	..	..	..	..
Muzzle Velocity, feet.	2800	2600*	2100	2362	2051	2297	2460	2428	2100	2067	1903	2242	2300	2070	2502	2361	2570	2200	2279
Muzzle Energy, Total foot-tons	5442	21120	13760	17406	11670	11303	4196	1893	13750	2964	7760	7319	11344	3328	..	1785	2060	419	404
Perforation through Iron by Tresidder's formula	22·8	33·6	24·5	29·2	22·9	25·7	18·9	14·2	24·5	13·9	19·2	20·2	25·6	15·6	..	13·6	15·3	8·0	8·4
Perforation Krupp Steel, 3000 yds.	4¾	10½	6	8	6	6½	4¼	..	6½	..	4¾	4¾	6½	..	..	..	..	..	..

* Schneider-Canet. There are also 6-pdrs., with M.V. 2165 f.s. to 2310 f.s., and 3-pdrs., with M.V. 2428 f.s. † Smokeless powder.

NATURE OF GUN.	Calibre.	Weight.	Total Length.	Total Length of Bore.	Length of Rifling.	Twist of Rifling.	Length of Chamber.	Weight of Service Charge. Brown Powder.	Weight of Service Charge. Smokeless Powder.	Weight of Projectile.	Muzzle Velocity (Service). Brown Powder.	Muzzle Energy. Brown Powder.	Perforation of Wrought Iron at Muzzle.†	Perforation of Krupp Steel at 3000yds.
	inch.	tons.	feet.	inch.	inch.		inch.	lbs.	lbs.	lbs.	ft.-seconds.	ft.-tons.	inch.	inch.
3-in. (14 pr.)	3	0·87	12·5	149·7	125·5	..	21·3	..	5	14	3000	874	13·5	..
4-in. Q.F., Mark I.	4	1·5	13·7	157·3	130·3	zero to 1 in 25	24·7	12 to 14	..	33	2000	915	9·8	..
4-in. Q.F. Gun	4	1·5	13·7	157·5	128·1	..	25·4	..	..	33	2000	..	9·8	..
4-in. Q.F., Mark VII., of 50 Cals.	4	2·56	17·0	200·0	168·4	..	31·6	..	15	32	2900	1,939	16·9	..
5-in. Q.F., Mark I.	5	2·8	13·5	150·3	120·8	{1 in 180 to 1 in 30}	27·1	26 to 29	..	60	2000	1,660	11·8	..
5-in. Q.F. Gun	5	3·1	17·4	191·5	164·4	zero to 1 in 25	32·0	28 to 30	..	50	2300	1,834	13·2	..
5-in. Q.F., Mark V.	5	4·46	21·3	250	212·9	..	37·2	..	27	60	2900	3,503	20·5	4½
6-in. B.L.R., Mark I.	6	4·8	15·8	176·0	136·7	{1 in 180 to 1 in 30}	36·9	50	..	100	2000	2,773	..	..
6-in. B.L.R., Mark II.	6	4·9	16·1	180·1	144·9	..	32·7	45 to 48	..	100	2000	..	13·8	..
6-in. B.L.R., Mark III., of 30 Cals.	6	4·8	16·3	183·8	147·3	zero to 1 in 25	34·0	44 to 47	..	100	2000	..	..	..
6-in. B.L.R., Mark III., of 35 Cals.	6	5·2	18·8	213·8	177·3	..	34·0	..	..	100	2080	2,990	14·7	..
6-in. B.L.R., Mark III., of 40 Cals.	6	6·0	21·3	243·8	207·3	..	34·0	..	..	100	2150	3,204	15·4	..
6-in. Q.F. Gun	6	6·0	21·3	243·8	204·3	..	37·0	44 to 47	..	100	2150	3,200	15·4	..
6-in. Q.F., Mark VI.	6	8·17	25·0	293·7	245·3	..	48·4	..	46	100	2900	5,838	24·2	5
7-in. Q.F.	7	..	..	..	..	..	..	..	74	165	2900	9,646	28·7	6½
8-in. B.L.R., Mark I.	8	{12·3 / 12·9}	21·5	239·9	195·2	{1 in 180 to 1 in 30}	42·1	105 to 115	..	{250 / 250}	{2000 / 2000}	6,932	19·0	4½
8-in. B.L.R., Mark II.	8	13·0	21·5	239·9	195·2	..	42·1	..	..	..	..	..	19·0	4½
8-in. B.L.R., Mark III., of 35 Cals.	8	13·1	25·4	290·5	242·8	zero to 1 in 25	45·1	..	..	250	2080	7,498	20·1	4¾
8-in. B.L.R., Mark III., of 40 Cals.	8	15·2	28·7	330·5	282·8	..	45·1	..	..	250	2150	8,011	21·1	5
8-in. B.L.R., Mark V., of 45 Cals.	8	18·0	28·6	335·0	271·0	..	64·0	..	115	250	2800	13,602	31·4	8
10-in. B.L.R., Mark I., of 30 Cals.	10	25·7	27·4	306·3	247·3	{1 in 180 to 1 in 35}	57·2	225 to 240	..	500	2000	13,864	24·0	6½
10-in. B.L.R., Mark I., of 35 Cals.	10	{27·1 / 28·2}	30·5	343·8	283·7	zero to 1 in 25	57·2	..	..	500	2060	14,709	25·0	6¾
10-in. B.L.R., Mark II., of 30 Cals.	10	25·1	27·4	307·3	247·3	{zero to 1 in 26·8}	57·2	..	..	500	2000	13,864	24·0	6½
10-in. B.L.R., Mark II., of 35 Cals.	10	27·6	31·2	354·9	294·9	zero to 1 in 25	57·2	..	..	500	2100	15,285	25·8	7
10-in. B.L.R., Mark III., of 40 Cals.	10	33·4	33·3	389·0	313·4	..	75·6	..	240	500	2800	27,204	42·0	12
12-in. B.L.R., Mark I.	12	45·2	36·8	419·2	343·1	..	74·1	425	..	850	2100	25,985	30·8	9
12-in. B.L.R., Mark III., of 40 Cals.	12	52	41·8	480·1	388·1	..	91·9	..	350	850	2800	46,246	47·2	16
13-in. B.L.R., Mark I. and II.	13	60·5	40·0	454·5	370·5	..	80·9	..	230	1100	2100	33,627	33·5	11

NOTE.—The weight of fixed ammunition for Q.F. 4-in. and 5-in. guns is 58 and 95 lbs. respectively.

† By Tresidder's formula.

ELSWICK GUNS.

This Table is supplied by the Manufacturers.

					*						Naval Landing.	Field.	Field.	Horse Artillery.	Field.
Diameter of Bore, ins.	1·46	1·46	1·85	1·85	1·85	2·24	2·24	3	3	3	3	3	3	3	3·3
do. do. mm.	37	37	47	47	47	57	57	76	76	76	76	76	76	76	84
Length of Bore, cals.	25	45	40	50	46	40	50	40	50	50	22	28	30	23	28
Weight of Gun	lb. 79	lb. 268	lb. 506	lb. 1067	lb. 560	lb. 840	cwt. 10¼	cwt. 12	cwt. 18	cwt. 18½	cwt. 6·0	cwt. 7·25	cwt. 7·5	cwt. 6	cwt. 9
do. Projectile, lbs.	1·1	1·5	3·3	3 3	3·3	6	6	12½	14	12·5	13·2	15	14·3	12·5	18·5
do. Cordite Charge [lbs	oz. 1·125	oz. 4.5	oz. 7·94	lb.oz. 1 4⅝	oz. 8·0	oz. 9·2	...	lb.oz. 1 10	lb oz. 3 0	lb.oz. 3 4	lb.oz. 1 1½	lb.oz. 1 5	lb.oz. 1 0⅜	lb.oz. 1 0½	lb.oz. 1 3¾
do. M.D. do., lbs.	...	...	...	1·6	...	...	lb.oz. 1 3	2 0	3 11	4·0	...	..	...	1 3	1 6
Muzzle Velocity, f.s.	1540	2300	2132	2800	2300	1968	2400	2210	2690	2800	1700	1700	1660	1700	1635
Muzzle Energy, f.t.	18	55	104	179	121	161	240	473	702	680	265	300	274	250	336
Penetration at Muzzle, ins.	1·9	4·3	5·2	7·8	5·7	5·6	8·0	8·8	11·9	11·6	...	...	...	...	...
Rounds per Minute ...	...	25	30	30	30	25	25	20	20	20	20	20	20	20	20

	Jointed Howitzer.			Howitzer.	Howitzer.			Field Position.	Howitzer.		Howitzer.				
Diameter of Bore, ins.	3 3	3·5	4	4·3	4·7	4 7	4·7	5	5	5·87	6	6	6	6	7·5
do. do. mm.	84	89	102	109·2	120	120	120	127	127	149	152	152	152	152	190
Length of Bore, cals.	16	40	50	12·5	12	40	45	32	8·4	46	12	40	45	50	45
Weight of Gun	lb. 407	cwt. 24	cwt. 41·0	cwt. 7	cwt. 10	cwt. 42	cwt. 53	tons 2	cwt. 9	tons 7	cwt. 25	tons 6·6	tons 7·35	tons 9	tons 13·8
do. Projectile, lbs.	15	20	31	40	45	45	45	60	50	99·25	100	100	100	100	200
do. Cordite Charge [lbs	oz. 11	4·0	8·5	oz. 15·75	1·5	5·5	lb.oz. 8 2½	8·25	oz. 11·5	21·5	2·1	18·3	26	36	...
do. M.D. do., lbs.	...	...	10	...	...	...	...	...	...	...	...	...	32	46	74·25
Muzzle Velocity, f.s.	1090	2430	2850	980	1070	2200	2552	2095	782	2625	857	2500	2800	3050	2900
Muzzle Energy, f.t.	123	819	1746	266	357	1510	2110	1826	212	4742	509	4334	5436	6492	11663
Penetration at Muzzle, ins.	...	11·0	16·0	...	...	11·6	15·1	12·9	...	21·5	...	19·5	25·7	26·3	31·8
Rounds per Minute ...	...	17	15	...	...	12	12	10	...	10	..	10	10	10	5

Diameter of Bore, ins.	7·5	7·5	8	8	8·24	9·2	9·2	10	10	10	12	12	12
do. do. mm.	190	190	203	203	210	234	234	254	254	254	305	305	305
Length of Bore, cals.	50	50	45	50	44	46	50	40	45	50	40	40	45
Weight of Gun	tons 15·7	tons 16	tons 18·0	tons 21	tons 18·1	tons 27·65	tons 28	tons 31	tons 34	tons 41	tons 48·5	tons 51	tons 58
do. Projectile, lbs.	200	200	250	250	308·6	380	380	450	500	500	850	850	850
do. Cordite Charge [lbs.	51	...	...	...	47	103	...	81·5	136	...	141	...	...
do. M.D. do., lbs.	63	76	66	90	52	120	151	86·5	150	200	155	282	325
Muzzle Velocity, f.s.	2850	3000	2600	3000	2300	2650	3030	2400	2750	3000	2400	2650	2900
Muzzle Energy, f.t.	11264	12481	1·781	15600	11320	18500	24190	17973	26219	33318	33949	41386	49568
Penetration of Muzzle, ins.	31·5	32·75	29·6	35·7	27·0	34·0	41·4	29·9	39·8	45·1	38·4	44·6	51·0
Rounds per Minute ...	5	5	5	5	5	4	4	3	3	3	2	2	2

Some Results Actually Obtained.

12 pr. 50 cals., Kite: 10 rounds in 31 seconds.

4·7-in. 42 cwt. gun with single motion breech mechanism: 5 rounds in 22 seconds at Silloth at a target—2 hits, range 1000 yards; 7 rounds in 25 seconds at drill.

Barfleur prize firing, 4·7-in. Q.F., 5·7 hits per gun per minute.

6-in. twin mounting, Cumberland: 5 pair rounds in 109 seconds.

6-in. gun with single motion breech mechanism: 7 rounds in 61 seconds at Silloth, Cordite charge; 4 rounds in 20 seconds at drill.

Terrible (China), prize firing, 6-in. Q.F., 4·25 hits per gun per minute, and 11 rounds in 2 minutes.

Ariadne prize firing, 6-in. Q.F., 19 rounds, 17 hits in 2 minutes.

7·5-in. gun, Carnarvon: 8 rounds in 111 seconds.

9·2-in. gun, Aboukir: 5 rounds in 85 seconds.

9·2-in. gun, King Edward VII.: 6 rounds in 110 seconds.

12-in. gun, interval 49 seconds, Illustrious: 6 rounds were fired from 1 turret in 1 minute 47 seconds.

Pair 12-in. guns, Goliath, 8 rounds in 2 minutes 10 seconds.

Ocean (China), prize firing, 12-in. B.L., 0·54 hits per gun per minute.

Mars (Channel) „ „ 0·42 „ „

Russell, battle practice, 12-in. barbette, 14 hits per gun per minute.

* Also arranged for Landing Carriage.

VICKERS SONS & MAXIM'S GUNS AND MOUNTINGS.

This Table is supplied by the Manufacturers.

		37 mm. 30 cal.	37 mm. 42·5 cal.	3-pdr. 50 cal.	6-pdr. 50 cal.	Mountain. 75 mm. 10·7 cal.	Field. Light. 3-in. 22.64 cal.	Field. Heavy. 3-in. 29 cal.	3-in. 50 cal.	4-in. 45 cal.	4-in. 50 cal.	4·7-in. 45 cal.	4·7-in. 50 cal.
Gun.	Diameter of Bore .ins.	1·457	1·457	1·85	2·244	2·953	3	3	3	4	4	4·724	4·724
	Length of Bore . .ins.	43·5	62	92·5	112·2	31·6	67·92	87·2	150	180	200	212·6	236·2
	Length of Gun . .ins.	73·75	94	98·9	116·4	35·85	72·22	90·63	154	180·35	206·35	220	243·6
	Maximum pressure in Chamber, tons per sq. in.	13	14	16	15	8	14·5	15	17	17	17	17	17
	Weight of Charge lbs.	·0782	·1875	1·066	1·469	·391	1·078	1·875	5·375	8·3	11·75	19·5	19·5
	Weight of Projectile lbs.	1	1·25	3·3	6	12·5	12·5	17·63	12·5	31	31	45	45
	Weight of Gun . . .	c. q. l. 3 2 24	c. q. l. 5 1 19	c. q. l. 5 2 4	c. q. l. 8 1 18	c. q. l. 2 0 13	c. q. 5 3	c. q. 7 2	c. q. l. 16 1 16	t. c. q. 1 14 1	t. c. q. 1 16 1	t. c. q. 3 3 3	t. c. 3 6
	Muzzle Velocity . .f.s.	1800	2350	2800	2500	918	1700	1700	3000	2700	2950	2925	3000
	Muzzle Energy . .f.t.	22·5	48	179·4	260	73	250	353·4	780	1567	1870	2670	2810
	Penetration of Wrought Iron Plate at Muzzle. Gavre formula . .ins.	1·9	3·3	6·7	7	..	..	..	11·25	13·6	15·4	16·65	17·25
	Penetration of Mild Steel Plate at Muzzle. Gavre formula . . . .ins.	1·5	2·6	5·1	5·4	..	..	..	8·7	10·5	11·9	12·9	13·4
	Penetration of Hard Steel Plate at 3000 yards. Gavre formula . ins.	..	..	..	..	..	..	..	..	..	..	..	4·2
	Rounds per minute . .	300	300	30	28	14	20	20	20	15	15	12	12
Mounting.	Weight of Mounting complete with Shield . .	c. q. l. 4 1 10	c. q. l. 3 2 5	c. q. 5 3	c. q. l. 8 3 21	c. q. l. 5 3 5	Weight of equipment with 18 rounds. t. c. q. 1 8 3	Weight of equipment with 36 rounds. t. c. 1 16	t c. q. 1 6 1	t. c. 3 3	t. c. q. 3 5 3	t. c. 3 16	t. c. q. 3 18 3
	Thickness of Shield .ins.	1/4	no	no	3/16	no	1/8	no	2	2 & 5/16	2 & 5/16	2 & 5/16	2 & 5/16
	Weight of Shield . . .	q. l. 3 11	shield	shield	1 cwt.	shield	1 cwt.	shield	c. q. 9 0	c. q. l. 17 0 22	c. q. l. 17 0 22	t. c. q. 1 4 3	t. c. q. 1 4 3
	Angle of Elevation . .	16°	13°	20°	20°	26°	16°	16°	20°	20°	20°	20°	20°
	Angle of Depression . .	25°	25°	20°	15°	10°	8°	8°	10°	7°	7°	7°	7°

		14 cm. 45 cal.	6-in. 45 cal.	6-in. 50 cal.	7·5-in. 45 cal.	7·5-in. 50 cal.	8-in. 45 cal.	8-in. 50 cal.	9·2-in. 47 cal.	9·2-in. 50 cal.	10-in. 45 cal.	12-in. 40 cal.	12-in. 45 cal.
Gun.	Diameter of Bore .ins.	5·512	6	6	7·5	7·5	8	8	9·2	9·2	10	12	12
	Length of Bore . .ins.	248	269·5	300	337·5	375	360	400	429·3	460	450	480	540
	Length of Gun . .ins.	257·7	279·2	310·07	349·2	386·7	372·1	412·125	442·35	473	464·9	496·5	557·55
	Maximum pressure in Chamber, tons per sq. in.	16·5	17·75	18	18	17·5	17	18	18	18	18	18	18
	Weight of Charge lbs.	21·875	35·25	43	78·25	80·03	94	123·5	170·5	184	250	309	356
	Weight of Projectile lbs.	88·19	100	100	200	200	250	216·7	380	380	496·7	850	850
	Weight of Gun . . .	t. c. 5 18	t. c. q. 7 8 2	t. c. 7 16	t. c. q. 14 0 2	t. c. 16 0	t. c. q. 18 16 2	t. c. 16 19	t. c. 28 1	t. c. q. 27 16 1	t. c. 34 11	t. c. 50 7	t. c. 57 14
	Muzzle Velocity . .f.s.	2800	3012	3290	2875	3007	2850	3300	3025	3110	3000	2750	3000
	Muzzle Energy . .f.t.	4990	6290	7505	11465	12540	14080	16360	24110	25485	30990	44570	53045
	Penetration of Wrought Iron Plate at Muzzle. Gavre formula . .ins.	22·1	23·65	26·9	28·75	30·75	31·1	34·6	39·25	40·85	43·2	45·8	51·9
	Penetration of Mild Steel Plate at Muzzle. Gavre formula . . . .ins.	17·1	18·4	20·9	22·25	23·7	24·1	26·8	30·45	31·7	33·55	35·5	40·2
	Penetration of Hard Steel Plate at 3000 yards. Gavre formula . ins.	6·2	6·3	6·95	8·9	9·33	10	10·1	13·35	13·85	15·3	17·45	19·6
	Rounds per minute . .	10	10	10	8	8	6	6	4	4	3	2	2
Mounting.	Weight of Mounting complete with Shield . .	Depending on type of Mounting used.											
	Thickness of Shield .ins.												
	Weight of Shield . . .												
	Angle of Elevation . .												
	Angle of Depression . .												

SCHNEIDER - CANET GUNS.

The Information in this Table is given by the Manufacturers.

Calibre, in centimètres	30·5		27·5		24		20			15			12			10			7·5		6·5		5·7		4·7	3·7
Calibre, in inches	12·0	12·0	10·8	10·8	9·45	9·45	7·9	7·9	7·9	5·9	5·9	5·9	4·7	4·7	4·7	3·9	3·9	3·9	3·0	3·0	2·5	2·5	2·25	2·25	1·85	1·45
Length, in calibres	40	45	40	45	40	45	40	45	50	40	45	50	40	45	50	40	45	50	45	50	45	50	50	60	60	60
Weight, tons	38·6	44·0	29·0	32·7	17·9	21·4	11·6	12·6	13·8	5·4	5·9	6·6	2·8	3·1	3·4	1·7	1·8	2·0	·82	·94	·57	·66	·45	·55	·31	·17
Weight of A.P. Projectile, lbs.	683	683	507	507	331	331	198	198	193	88	88	88	46	46	46	28½	28½	28½	13¼	13¼	8¾	8¾	6	6	3¼	1¾
Weight of Charge	Not	stated																								
Muzzle Velocity, ft.-secs.	3051	3248	3051	3248	3051	3248	3051	3215	3346	3018	3166	3314	3018	3150	3314	3018	3150	3314	2772	2953	2772	2953	2920	3248	3248	3150
Muzzle Energy, ft.-tons	44130	50010	32780	37130	21850	24240	12792	14210	15390	5569	6128	6709	2912	3169	3506	1846	1918	2123	707	818	467	540	354	440	238	120
Perforation of Steel at muzzle (Gavre formula)	40·5	44·7	37·4	41·2	31·4	34·6	26·4	28·4	30·3	19·2	20·4	22·2	15·1	16·2	17·5	13·0	13·8	14·9	8·7	9·5	7·5	7·9	7·1	8·3	6·5	5·1
Perforation, Wrought Iron, at muzzle, Tresidder's formula	48·0	53·0	43·3	47·6	37·7	41·2	32·0	34·3	36·6	24·4	26·0	28·2	19·6	20·7	22·6	17·3	18·4	19·8	..	..	..	..	..	..	..	..
Perforation of Krupp Steel, 3000 yards	15	16½	13	14½	10	11	8	8¾	9¼	5	5½	5¾	4	4¼	4½	..	..	4	..	..	..	..	..	..	..	..

Tables supplied by Manufacturers.

LIGHT GUNS.

Calibre, in centimètres	7·5			10·5			12			15			21			24			28			30·5		
Calibre, in inches	2·95			4·13			4·72			5·91			8·27			9·45			11·02			12·01		
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·84	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·69	19·55	22·0	24·46	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·20	199·25	222·45	218·12	247·49	276·78	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	1485·9	1700·9	1935·7	3748	4189	4740	5512	6283	7055	10582	12015	13558	29320	33290	37254	44090	50264	56443	70104	79811	89503	90610	103174	115742
Weight of Gun, in tons	0·69	0·79	0·89	1·73	1·93	2·18	2·54	2·90	3·25	4·88	5·54	6·25	13·51	15·34	17·17	20·32	23·16	26·01	32·31	36·78	41·25	41·76	47·55	53·34
Weight of Steel Projectile, in lbs.	11·5	11·5	11·5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112·4	112·4	308·6	308·6	308·6	474·0	474·0	474·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	2·24	2·62	3·07	8·21	9·53	10·87	12·23	14·23	16·25	23·54	27·34	31·19	64·9	75·62	86·42	97·68	113·98	130·07	155·10	181·00	206·57	200·86	233·91	266·93
Muzzle Velocity, in ft.-secs.	2385	2572	2726	2638	2815	2992	2674	2867	3048	2651	2841	3018	2657	2848	3028	2657	2851	3031	2661	2851	3031	2654	2848	3028
	2116	2283	2418	2326	2484	2638	2359	2526	2687	2379	2546	2707	2385	2559	2720	2365	2533	2697	2352	2523	2680	2356	2526	2684
Muzzle Energy, total ft.-tons	452·7	526·0	591	1491	1697	1917	2298	2636	2982	4408	5060	5721	12198	14005	15845	18362	21105	23880	29204	33561	37917	37756	43403	49050
Perforation through Steel, in ins.	5·97	6·69	7·24	9·8	10·75	11·73	11·58	12·8	13·94	14·65	16·14	17·60	21·06	23·23	25·39	24·33	26·89	29·37	28·74	31·73	34·65	30·6	34·76	37·99
Perforation through Iron, Tresidder's formula	8·2	9·2	10·1	13·3	14·5	16·0	15·5	17·2	18·8	19·3	21·2	23·2	27·1	30·1	32·9	31·2	24·7	37·8	36·0	40·0	43·8	39·1	43·5	46·4
Perforation Krupp Steel, 3000 yards	..	..	..	..	..	..	..	..	4	4¼	4½		7	7¾	8¾	8¾	10	11	11	13	15	13½	15	17

HEAVY GUNS.

Calibre, in centimètres	7·5			10·5			12			15			21			24			28			30·5		
Calibre, in inches	2·95			4·13			4·72			5·91			8·27			9·45			11·02			12·01		
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·84	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·69	19·55	22·0	24·46	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·20	199·25	222·45	218·12	247·49	276·78	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	1860·7	2094·4	2325·8	4519·2	5115·1	5688	6724·2	7606·2	8488	12897	14661	16314	35711	40341	44972	53792	60843	67904	85544	96784	108030	110671	125003	139772
Weight of Gun, in tons	0·85	0·96	1·07	2·08	2·35	2·62	3·10	3·51	3·91	5·94	6·76	7·52	16·46	18·59	20·73	24·79	28·04	31·29	39·42	44·60	49·79	51·00	57·61	64·42
Weight of Steel Projectile, in lbs.	11·5	11·5	11·5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112·4	112·4	308·6	308·6	308·6	474·0	474·0	474·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	2·43	2·78	3·15	8·71	10·12	11·53	13·01	15·10	17·22	24·91	28·88	33·04	68·78	80·03	91·49	103·84	120·59	137·79	165·12	191·80	218·70	213·40	247·58	282·85
Muzzle Velocity, in ft.-secs.	2484	2661	2822	2723	2910	3094	2763	2976	3159	2743	2949	3133	2749	2953	3140	2746	2956	3143	2749	2959	3140	2746	2953	3140
	2205	2362	2507	2402	2566	2730	2438	2625	2785	2457	2644	2808	2467	2654	2822	2441	2628	2795	2431	2618	2776	2434	2618	2785
Muzzle Energy, total ft.-tons	490·5	562·8	633·8	1588	1814	2049	2452	2840	3204	4711	5450	6151	13037	15070	17039	19588	22702	25655	31205	36142	40725	40338	46695	52729
Perforation through Steel, in ins.	6·39	7·01	7·64	10·28	11·26	12·32	12·13	13·50	14·69	15·36	17·01	18·54	22·13	24·49	26·73	25·47	28·31	30·87	30·12	33·47	36·42	32·4	36·65	40·08
Perforation through Iron, Tresidder's formula	8·7	9·7	10·6	13·9	15·4	16·8	16·3	18·1	19·8	20·1	22·3	24·5	28·5	31·8	34·6	32·7	36·3	39·8	37·6	42·2	46·5	41·0	45·8	50·1
Perforation Krupp Steel, 3000 yards	..	..	..	..	..	..	..	4	4½	4½	4¾	5¼	7½	8¼	9	9	10½	12	12	14	16	14	16	18½

NOTE.—Every one of the Guns included in the Tables has been actually constructed and can be supplied on order.

KRUPP QUICK-FIRING GUNS, Mark 1901.

Tables supplied by Manufacturers.

LIGHT GUNS.

Calibre, in centimètres	7·5			10·5			12			15			21			24			28			30·5		
Calibre, in inches	2·95			4·13			4·72			5·91			8·27			9·45			11·02			12·01		
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·84	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·69	19·55	22·00	24·44	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·20	199·25	222·45	218·12	247·49	276·78	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	1488	1711	1936	3748	4189	4740	5512	6283	7055	10582	12015	13558	29321	33290	37254	44090	50264	56443	70104	79811	89503	90610	103174	115742
Weight of Gun, in tons	0·68	0·79	0·89	1·73	1·93	2·18	2·54	2·90	3·25	4·88	5·54	6·25	13·51	15·34	17·17	20·32	23·16	26·01	32·31	36·78	41·25	41·76	47·55	53·34
Weight of Steel Projectile, in lbs.	11·5	11·5	11·5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112·4	112·4	308·6	308·6	308·6	474·0	474·0	474·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	2·77	3·12	3·54	10·47	12·57	14·33	15·66	17·97	20·62	29·99	34·40	39·47	82·47	94·59	108·71	124·58	143·10	164·27	198·41	227·07	262·35	255·73	293·21	337·30
Muzzle Velocity, in ft.-secs.	2690	2890	3068	2835	3022	3199	2877	3038	3225	2854	3008	3196	2851	3015	3196	2854	3018	3199	2854	3018	3202	2854	3018	3199
	2388	2566	2723	2500	2661	2822	2539	2677	2841	2556	2697	2858	2559	2707	2868	2533	2687	2845	2523	2664	2835	2526	2674	2838
Muzzle Energy, total ft.-tons	576	665	749	1720	1952	2191	2659	2969	3340	5099	5680	6389	14037	15684	17620	21169	23718	26655	33561	37595	42435	43564	48728	54859
Perforation through Steel, in ins.	7·13	7·91	8·58	10·87	11·92	12·93	12·87	13·90	15·15	16·15	17·41	18·98	23·20	25·13	27·30	26·96	29·20	31·73	31·80	34·45	37·48	34·94	37·84	41·10
Perforation through Iron, Tresidder's formula	9·9	11·0	11·7	14·7	17·24	18·77	18·35	19·91	21·77	22·66	24·52	26·84	31·73	34·51	37·65	36·47	39·66	43·27	42·52	46·28	50·57	46·42	50·47	55·08
Perforation Krupp Steel, 3000 yards	..	..	..	..	..	..	3·52	3·74	4·02	4·98	5·29	5·66	8·14	8·65	9·22	9·84	10·45	11·13	12·11	12·86	13·70	13·58	14·41	15·33

HEAVY GUNS.

Calibre, in centimètres	7·5			10·5			12			15			21			24			28			30·5		
Calibre, in inches	2·95			4·13			4·72			5·91			8·27			9·45			11·02			12·01		
Total Length of Gun, in cals.	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50	40	45	50
Total Length, in feet	9·84	11·07	12·30	13·78	15·5	17·22	15·75	17·7	19·69	19·55	22·00	24·44	27·56	30·9	34·45	31·50	35·4	39·37	36·75	41·3	45·93	40·03	45·0	50·03
Length of Bore, in inches	108·66	123·43	138·19	153·55	174·21	194·89	175·20	199·25	222·45	218·12	247·49	276·78	305·91	347·29	388·59	350·80	398·28	445·28	409·46	464·62	519·70	445·67	505·95	565·76
Weight of Gun, in lbs.	1861	2094	2326	4519	5115	5688	5842	6724	7606	11244	12897	14661	31080	35711	40341	46741	53792	60843	74514	85544	96784	96343	110671	125003
Weight of Gun, in tons	0·85	0·96	1·07	2·08	2·25	2·62	2·70	3·10	3·51	5·18	5·94	6·76	14·32	16·46	18·59	21·54	24·79	28·04	34·34	39·42	44·60	44·40	51·00	57·61
Weight of Steel Projectile, in lbs.	11·5	11·5	11.5	30·86	30·86	30·86	46·30	46·30	46·30	90·39	90·39	90·39	249·1	249·1	249·1	374·8	374·8	374·8	595·2	595·2	595·2	771·6	771·6	771·6
	14·6	14·6	14·6	39·68	39·68	39·68	59·52	59·52	59·52	112·4	112·4	112·4	308·6	308·6	308·6	474·0	474·0	474·0	760·6	760·6	760·6	981·0	981·0	981·0
Weight of Charge, in lbs.	2·99	3·35	3·76	11·80	13·45	15·32	17·53	19·96	22·93	33·52	38·15	43·88	92·59	105·40	120·83	140·02	159·42	182·57	222·67	253·53	291·00	286·60	326·28	374·78
Muzzle Velocity, in ft.-secs.	2876	2999	3123	2930	3107	3281	2920	3097	3268	2882	3068	3242	2887	3068	3245	2897	3074	3248	2897	3074	3251	2894	3068	3248
	2664	2775	2885	2582	2740	2894	2572	2733	2887	2589	2753	2900	2592	2756	2913	2576	2733	2887	2562	2720	2871	2562	2720	2877
Muzzle Energy, total ft.-tons	620	703	795	1836	2065	2307	2736	3082	3429	5228	5905	6583	14425	16232	18168	21815	24557	27430	31690	39047	43564	44855	50341	56473
Perforation through Steel, in ins.	7·52	8·23	8·98	11·40	12·40	13·40	13·15	14·29	15·43	16·42	17·91	19·37	23·62	25·76	27·91	27·54	29·98	32·43	32·48	35·37	38·31	35·63	38·71	42·01
Perforation through Iron, Tresidder's formula	10·5	11·3	12·0	16·46	17·97	19·50	18·76	20·49	22·21	23·05	25·24	27·42	32·34	35·42	38·53	37·29	40·76	44·27	43·51	47·56	51·73	47·39	51·72	56·35
Perforation Krupp Steel, 3000 yards	..	..	..	..	..	..	3·55	3·83	4·08	5·05	5·40	5·76	8·25	8·81	9·37	10·00	10·66	11·32	12·30	13·11	13·92	13·78	14·66	15·60

BETHLEHEM STEEL CO.

ORDNANCE.

This Table is supplied by the Manufacturers.

NATURE OF GUN.	Calibre in inches.	Calibre in cms.	Length of bore.	Length of gun.	Weight of gun.	Charge of smokeless powder.	Weight of projectile.	Muzzle velocity.	Muzzle energy.	Perforation at muzzle of U.S. standard face-hardened armour by capped A.P. projectiles.	Perforation Krupp steel 3000 yds.
			cals.	cals.	lbs.	oz.	lbs.	foot-seconds.	foot-tons.		
1-pr.	1·457	3·7	46·4	50	120	3	1	2300	37		..
3-pr.	1·851	4·7	46	50	550	19·5	3	2600	142	2	..
6-pr.	2·244	5·8	50	54	960	22·5	6	2400	240	2·5	..
3-in. Q.F., Light . .	3	7·62	27	33	720	22	15	1850	345	3·5	..
						lbs.					
3-in. Q.F.	3	7·62	50	51·4	1900	5	15	2800	8064	4·4	..
					tons.						
4-in. Q.F.	4	10·16	39·4	41·1	1·5	8	33	2250	345	3·9	..
4-in. Q.F.	4	10·16	50	51	2·6	15	33	2900	1924	6·8	..
4·7-in. Q.F.	4·7	12	48·5	50	3·9	15	45	2850	2625	7·2	..
5-in. Q.F., No. 1 ‡ . .	5	12·7	45·1	46·3	3·4	9·5	50	2200	2180	7·0	..
5-in. Q.F., No. 2 . .	5	12·7	45·1	45·9	3·4	14	55	2600	2577	7·1	..
5-in. Q.F., No. 3 § . .	5	12·7	50	51·1	4·6	27	50	2900	3207	7·7	4¼
6-in. Q.F., No. 1 § . .	6	15·24	41	42·3	6·1	16	100	2200	3355	7·5	..
6-in. Q.F., No. 2 . .	6	15·24	44	45	7·1	28	100	2600	4691	8·8	4½
6-in. Q.F., No. 3 . .	6	15·24	50	51·5	7·9	46	100	2900	5830	10·6	5
8-in. Q.F., No. 1 . .	8	20·32	45	46·5	16·6	90	250	2500	10,833	13	6½
8-in., No. 2 ‡. . .	8	20·32	32	35	9·6	83	300	2300	10,528	13·2	6½
10-in., No. 1 ‡ . .	10	25·4	34·7	36·7	30	140	575	2300	21,086	17·2	9½
10-in., No. 2 . . .	10	25·4	40	41·4	32	140	500	2500	21,665	17·5	9½
10-in. Shell Gun . .	10	25·4	28·2	30	13	100	400	2200	13,420	13	7
12-in. ‡	12	30·48	35·3	36·9	51	240	1000	2300	36,671	21·7	13
12-in. Mortar ‡ ‖ . .	12	30·48	10	11·76	13	50	800	1325	9736	9·5	..
18-in. Shell Gun . .	18	45·72	28	29·3	60	400†	2000	2250*	70,185	25·3	..

Guns from 3 inches to 6 inches fitted with either a metallic cartridge case or a Debange pad.

* This velocity is reached, allowing the usual factor of safety for the gun. With an 1830-lb. explosive shell (500 lbs. of wet gun-cotton), a velocity of 1980 foot-seconds was reached with 8·2 tons pressure.

† 75 per cent. cellulose, 25 per cent. nitro-glycerine.

‡ U.S. Army type.

§ U.S. Navy type.

‖ These mortars have been found very accurate at ranges up to 10,000 yards, when fired at obscured targets representing a ship's deck.

Table Relating to Conversion of Measures.

Length.

Metric to English. — English to Metric.

I. Mètres.	II. Yards.	III. Feet.	IV. Inches.	V. Yards.	VI. Mètres.	VII. Feet.	VIII. Mètres.	IX. Inches.	X. Centimètres.
1	1·0936	3·2809	39·37	1	0·91438	1	0·30479	1	2·5400
2	2·1873	6·5618	78·74	2	1·82877	2	0·60959	2	5·0799
3	3·2809	9·8427	118·11	3	2·74315	3	0·91438	3	7·6199
4	4·3745	13·1236	157·48	4	3·65753	4	1·21918	4	10·1598
5	5·4682	16·4045	196·85	5	4·57192	5	1·52397	5	12·6998
6	6·5618	19·6854	236·22	6	5·48630	6	1·82877	6	15·2397
7	7·6554	22·9663	275·60	7	6·40068	7	2·13356	7	17·7797
8	8·7491	26·2472	314·97	8	7·31507	8	2·43836	8	20·3196
9	9·8427	29·5281	354·34	9	8·22945	9	2·74315	9	22·8596

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of yards	of feet	of inches	of mètres	of mètres	of centimètres
in 2354 mètres	in 12·4 mètres	in 30·5 centimètres	in 1026 yards	in 1742 feet	in 17·72 ins.
(see cols. I. & II.).	(see cols I. & III.).	(see cols. I. & IV.).	(see cols. V. & VI.).	(see cols. VII. & VIII.).	(see cols. IX. & X.)
mètres. yards.		Note, 1 m.=100 cm.		feet. mètres.	inches. cms.
2000=2187·3	mètres. feet.		yards. mètres.	1000=304·79	10·0 =25·400
300= 328·09	10 =32·809	cms. inches.	1000=914·38	700=213·36	7·0 =17·780
60= 54·68	2 = 6·562	30·0=11·811	20= 18·29	40= 12·19	0·7 = 1·778
4= 4·37	0·4= 1·312	·5= ·197	6= 5·49	2= 0·61	·02= ·051
∴ 2354=2574·44	∴ 12·4=40·683	∴ 30·5=12·008	∴ 1026=938·16	∴ 1742=530·95	∴ 17·72=45·009

Note.—A ready way of approximately converting all French measures into English inches is to multiply by 4 and apply the decimal point by common sense—Thus for a 15-cm. gun; 15 × 4 = 60. Now this Calibre cannot be 60 inches, nor can it be 0·6 inch; therefore it must be 6 inches. (The exact value is 5·906 in.)

Weight.

Metric to English. — English to Metric.

I. Kilo-grammes.	II. Tons.	III. Pounds Avoirdupois.	IV. Grains Troy.	V. Tons.	VI. Milliers.	VII. Pounds Avoir-dupois.	VIII. Kilo-grammes.	IX. Grains. Troy.	X. Gramme.
1	·000984	2·2046	15432·3	1	1·016	1	0·4536	1	·0648
2	·001968	4·4092	30864·7	2	2·032	2	0·9072	2	·1296
3	·002953	6·6139	46297·0	3	3·048	3	1·3608	3	·1944
4	·003937	8·8185	61729·4	4	4·064	4	1·8144	4	·2592
5	·004921	11·0231	77161·7	5	5·080	5	2·2680	5	·3240
6	·005905	13·2277	92594·1	6	6·096	6	2·7216	6	·3888
7	·006889	15·4323	108026·4	7	7·112	7	3·1751	7	·4536
8	·007874	17·6370	123458·8	8	8·128	8	3·6287	8	·5184
9	·008858	19·8416	138891·1	9	9·144	9	4·0823	9	·5832

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of tons	of pounds	of grains	of milliers	of kilogrammes	of grammes
in 35 milliers	in 56·3 kilo-grammes.	in 120 grammes	in 38 tons	in 68 pounds	in 85 grains
(see cols. I. & II.	(see cols. I. & III.).	(see cols. I. & IV.	(see cols. V. & VI.).	(see cols. VII. & VIII).	(see cols. IX. & X.).
Note, 1000 kg. =1 millier).	kgrms. lbs.	Note, 1000 grms. = 1 kg.)			
milliers. tons	50 =110·231	grammes. grains.	tons. milliers.	lbs. kgs.	grains. grammes.
30 = 29·53	6 = 13·228	100=1543·23	30 = 30·48	60 = 27·216	80 = 5·184
5 = 4·92	0·3= ·661	20= 308·65	8 = 8·13	8 = 3·629	5 = 0·324
∴ 3 = 31·45	∴ 56·3=124·120	∴ 120=1851·88	∴ 38 = 38·61	∴ 68 = 30·845	∴ 85 = 5·508

Note.—7000 grains troy = 1 pound avoirdupois.

PRESSURE.

Metric to English.			English to Metric.				Atmospheric to English.		English to Atmospheric.	
I. Kilogrammes per square centimètre.	II. Pounds per square inch.	III. Tons per square inch.	IV. Pounds per square inch.	V. Kilogrammes per square centimètre.	VI. Tons per square inch.	VII. Kilogrammes per square centimètre.	VIII. Atmospheres.	IX. Tons per square inch.	X. Tons per square inch.	XI. Atmospheres.
1	14·223	·00635	1	·07031	1	157·49	1	·00656	1	152·38
2	28·446	·01279	2	·14062	2	314·99	2	·01313	2	304·76
3	42·668	·01905	3	·21093	3	472·48	3	·01969	3	457·14
4	56·891	·02540	4	·28124	4	629·97	4	·02625	4	609·52
5	71·114	·03175	5	·35155	5	787·47	5	·03281	5	761·91
6	85·337	·03810	6	·42186	6	944·96	6	·03938	6	914·29
7	99·560	·04445	7	·49217	7	1102·45	7	·04594	7	1066·67
8	113·783	·05080	8	·56248	8	1259·95	8	·05250	8	1219·05
9	128·005	·05715	9	·63279	9	1417·44	9	·05906	9	1371·43

Note.—One atmosphere is taken to be 14 7 lbs. per square inch.

Explanation.—To convert any number from one measure to the other, take the value of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus, find the number

of pounds per square inch in 32·1 kilogrammes per square centimètre (see cols. I. & II.).	of tons per square inch in 3210 kilogrammes per square centimètre (see cols. I. & III.).	of kilogrammes per square centimètre in 15 lbs. per square inch (see cols. IV. & V.).	of kilogrammes per square centimètre in 18 3 tons per square inch (see cols. VI. & VII.).	of tons per square inch in 3254 atmospheres. (see cols. VIII. & IX.).	of atmosphere in 14·6 tons per square inch (see cols. X. & XI.).
kgs. per sq. cm. = lbs per sq. in.	kgs. per sq. cm. = tons per sq. in.	lbs. per sq. in. = kgs. per sq. cm.	tons per sq. in. = kgs. per sq. cm.	atmospheres. = tons per sq. inch.	tons per sq. in. = atmospheres.
30 = 426·68	3000 = 19 05	10 = ·7031	10 = 1574 9	3000 = 19·69	10 = 1523·8
2 = 28·45	200 = 1·27	5 = ·3516	8 = 1259·95	200 = 1·31	4 = 609·5
0·1 = 1·42	10 = ·06		0·3 = 47·25	50 = ·33	0·6 = 91·4
				4 = ·03	
32·1 = 456·55	∴ 3210 = 20·38	∴ 15 = 1·0547	∴ 18·3 = 2882·10	∴ 3254 = 21·36	∴ 14·6 = 222·7

ENERGY.

Metric to English.		English to Metric.	
I. Mètre-tons.	II. Foot-tons.	III. Foot-tons.	IV. Mètre-tons.
1	3·2291	1	0·3097
2	6·4581	2	0·6194
3	9·6872	3	0·9291
4	12·9162	4	1·2388
5	16·1453	5	1·5484
6	19·3743	6	1·8581
7	22·6034	7	2·1678
8	25·8324	8	2·4775
9	29·0615	9	2·7872

1 mètre-ton is termed a "dinamode" in Italy.

Explanation.—To convert any number from one measure to the other, take the values of the different multiples of 10 by shifting the position of the decimal point, and add together. Thus find the number

of foot-tons in 4367 mètre-tons (see cols. I. & II.).	of mètre-tons in 3592 foot-tons (see cols. III. & IV.).
mètre-tons. = foot-tons.	foot-tons. = mètre. tons.
4000 = 12916·2	3000 = 929·1
300 = 968·72	500 = 154 84
60 = 193·74	90 = 27·87
7 = 22·60	2 = ·62
∴ 4367 = 14101·26	∴ 3592 = 1112·43

PERFORATION THROUGH IRON AND STEEL WITH THE FACE NOT HARDENED.

To obtain perforation through steel equivalent to a given perforation through iron, and *vice versa*.

1 inch steel = $1\frac{1}{4}$ inches iron;

that is, 4 inches steel = 5 inches iron.

Thus, given 9·4 inches perforation through iron,

$$9 \cdot 4 \times \frac{4}{5} = 7 \cdot 52 \text{ inches steel;}$$

or, given 5·2 inches steel,

$$5 \cdot 2 \times \frac{5}{4} = 6 \cdot 5 \text{ inches iron.}$$

PART IV.

STATISTICS, OFFICIAL STATEMENTS AND PAPERS.

First Lord's Statement Explanatory of Navy Estimates, 1905-6.

THE Estimates for 1905-6 amount to £33,389,000, as opposed to £36,889,000 for the current year. This reduction is mainly accounted for by reductions on Votes 8 and 9, which are due to a decreased liability for new construction and to a decreased liability for repairs.

The decreased liability for new construction is due to the fact that the liability on the ships at the present moment under construction is not so great as was the liability on those under construction a year ago, and to the fact that the payment for the Triumph and Swiftsure, bought from the Chilian Government, does not recur. The decrease in the liability for repairs is due to the policy, explained in my Memorandum of December 6 last, of eliminating from the Navy, as far as possible, all ships which would be of comparatively small fighting value in time of war, and to the fact that the arrears in the repairs of the Fleet have been overcome. It is due to the late Controller, Rear-Admiral Sir William May, K.C.V.O., to say that I do not believe the Fleet has ever been in a more perfect state of repair than it is at the present moment.

The logical consequences of the policy explained in my Memorandum of December 6 last have also affected other parts of Vote 8, Vote 2, and other votes in an economical direction.

Administration.

No important changes have taken place in the organisation of the Admiralty during the past year, and the changes reported in previous years are all working well. By a new Order in Council dated August 10, 1904, the final step was taken in the readjustment of the distribution of business to the Members of the Board by eliminating from the work of the Senior Naval Lord everything that is not concerned with important naval policy and the preparation of the Fleet for war. The opportunity was taken at the same time to restore the old title of Sea Lord, and the titles of the naval Members of the Board henceforth will be First Sea Lord, Second Sea Lord, Third Sea Lord and Controller, Fourth Sea Lord.

I have to announce that the Board have appointed a special Committee to inquire into the present system of dockyard organisation and administration as it affects the *personnel* and the execution of shipbuilding and repairs. It is hoped that an increase of efficiency and of economy will result from the labours of the Committee, and it is especially desired that references and correspondence may be minimised and that a fuller decentralisation of the dockyards from the Admiralty and an ampler devolution of responsibility upon the Admirals Superintendent may be achieved.

Personnel.

The Navy suffered a great loss in the death of Rear-Admiral H. J. May, who had inaugurated the war course at Greenwich with such singular success. His place has been taken by Captain E. J. W. Slade, M.V.O., R N., and the work is proceeding satisfactorily. The Board, however, are of opinion that a great development could be given to the course if it could be transferred from Greenwich to Portsmouth, and provision is proposed under Vote 10 for building quarters on Whale Island for the Sub-lieutenants now resident in the Naval College in Portsmouth Dockyard. Much loss of time will thereby be avoided to the Sub-lieutenants undergoing their courses of gunnery, and the quarters at present occupied by them will become available for the officers attending the enlarged war course.

In my Memorandum of last year I mentioned that a scheme had been adopted in connection with the Medical Branch and the Chaplains of the Navy to enable young Surgeons and young Clergymen, who might not desire to make the Navy their permanent sphere of work, to join it for four or five years, at the end of which time they might either join the Service permanently at the discretion of the Admiralty or leave it with a substantial gratuity. It is still too soon to say whether this scheme is going to attract additional candidates for appointment, but I wish again to draw attention to it.

In September next the first batch of cadets who joined the Royal Naval College at Osborne will have completed two years there, and they will be transferred to the Royal Naval College at Dartmouth. Mr. Cyril E. Ashford, the first Headmaster of Osborne, who has inaugurated the teaching of the College so successfully, will be transferred to Dartmouth, and henceforth every cadet entering the Navy will pass his first two years at Osborne and his second two years at Dartmouth. The course of training will, of course, be consecutive. A few cadets have had to be withdrawn from the College, but none

I am happy to say on account of unsatisfactory conduct. Those who have been withdrawn have been so withdrawn on the authority of the Board, after consultation with the Captain and Headmaster of the College, either on the ground that they were not likely to pass satisfactorily the examination out of the College at the end of their period of training or on the ground that they were not thoroughly suited to the conditions of naval life. The plan of inviting all boys who apply for nominations to appear before the Committee of Inspection has continued to work with complete success, and all applicants have been treated on the same basis and with scrupulous fairness.

The gunnery of the Fleet continues steadily to improve, and the Admiralty have decided, with the concurrence of the Treasury, to appoint a new officer called the Inspector of Target Practice. His duties will in no way clash with those of the Director of Naval Ordnance. He will not be an Admiralty Officer, but, working under the superintendence of the First Sea Lord he will visit the Fleets and Squadrons and supply the Commanders-in-Chief with the most recent information which the Admiralty have at their disposal.

The total number of officers, seamen, boys, and Royal Marines, voted for the year 1904–5 was 131,100. The numbers asked for for 1905–6 are 129,000, showing a reduction of 2,100. This reduction is consequential on the policy, explained in my Memorandum of December 6, of eliminating from the Navy as many ships as possible that would be comparatively ineffective fighting factors in time of war. Vote 1 remains practically of the same amount as for the current year, because when an increase of numbers takes place which is spread over all the weeks in the year, it is only necessary to take money for the pay of that increase for half a year, and, consequently, the sum based on an increase last year of 4100 exactly meets the necessities of the case when there is a reduction of 2100, after that increase has been attained. If there had not been this reduction of men and boys there would have been a considerable increase on the vote for pay.

The experiment of enlisting a certain number of non-continuous service seamen and stokers has been successful, and it is proposed to increase the proportion of men so enlisted with a view to increasing the numbers of the Royal Fleet Reserve. It is also proposed to give greater facilities to continuous service men of good character, who for some reason may desire to retire into civil life before the expiration of their period of engagement, to do so on condition that they join the Royal Fleet Reserve. The progress of the Royal Fleet Reserve continues satisfactory, and by the end of the present financial year Class B is expected to number more than 6000 men.

Recruiting for the Royal Naval Reserve has also been satisfactory, but it is not necessary to increase the numbers beyond what they at present stand at, 29,500 men, owing to the steady increase of the Royal Fleet Reserve. The branch of the Royal Naval Reserve in Newfoundland continues to make good progress, and the branches in Australia and New Zealand have been well started during the year. The enlistment of Australians and New Zealanders for non-continuous service in the Royal Navy began during the year, and an excellent class of men have presented themselves. A small branch of the Royal Naval Reserve has also been established at Malta.

The Royal Naval Volunteer Reserve continues to do well, and strong divisions have been formed on the Thames, the Clyde, the Sussex coast, the Severn, and the Mersey, while a division is in progress of formation on the Tyne.

It will be recollected that the Committee on Naval Reserves, presided over by Sir Edward Grey, Bart, M.P., recommended that the Board should aim at a total reserve force of 50 per cent. of the numbers required to mobilise the Fleet, harbour establishments, signal stations, etc., for war. I am glad to be able to report that this standard has now been reached, and that after such mobilisation for war the numbers of active service ratings, Royal Fleet Reserve, Royal Naval Reserve, and Royal Naval Volunteer Reserve, which would remain available, amount to the required total.

Altogether, whether for the active service ratings of the Navy, boys, youths, and men, for the Royal Marines, or for the Royal Naval Reserves, nothing could be more satisfactory than the numbers and quality of those wishing to join His Majesty's naval forces. Indeed, the number of eligible candidates is far in excess of the requirements.

Construction, Reconstruction, and Repairs.

I have already explained the reasons for the diminution as compared with the current year of the sum (£9,566,000) asked for new construction for the year 1905–6. During the current year the work on the ships under construction both in the Royal and private dockyards has made steady and satisfactory progress. A delay of a few months beyond the time originally specified will take place in the completion of the armoured cruisers of the Devonshire class, but this delay was deliberately incurred by the Board for the sake of improving the armament in these ships by the substitution of a certain number of 7·5-in. for 6-in. guns. Of the current year's programme the two battleships of the Lord Nelson class have been given out to contract, and three armoured cruisers have been begun in the Royal

dockyards. In view of the changed conditions which have developed since the presentation of the Estimates of last year, the Board are prepared to take upon themselves the responsibility of recommending to Parliament that the fourth armoured cruiser and some of the destroyers of the year's programme should be postponed. Ten submarines have been ordered; one destroyer of the River class was bought ready-made from the makers and five ocean-going destroyers of a new type are on the eve of being ordered under circumstances which I will proceed to explain.

In the development of the destroyer class two qualities have successively predominated, speed and sea-keeping power. Their study of the tactical and other questions involved has led the Board to the conclusion that two classes of destroyer are required for the Navy, one for ocean work and the other for the narrow seas. They have accordingly decided to combine the qualities of speed and sea-keeping power in a special type of ocean-going destroyer, which will be expensive and of which, therefore, the numbers must be comparatively few, and to design a new type of coastal destroyer which will be comparatively cheap, and of which, therefore, the numbers can be larger.

Between April 1, 1904, and March 31, 1905, inclusive, the following ships will have been completed, and become available for service:—

4 *Battleships:* King Edward VII, Commonwealth, Swiftsure, Triumph.

1 *Armoured Cruiser:* Cornwall.

4 *Third-class Cruisers:* Diamond, Sapphire, Topaze, Amethyst.

12 *Submarines*, 9 *Destroyers*, 4 *Torpedo Boats.*

1 *River Gunboat* and a new *Admiralty Yacht.*

On April 1, 1905, there will be under construction:—8 battleships, 15 armoured cruisers, 1 second-class cruiser, 1 third-class cruiser, 8 scouts, 18 destroyers, 11, submarines.

The work of reconstruction and rearmament which was begun two years ago in respect of the battleships of the Barfleur and Royal Sovereign classes, and in respect of the Powerful, Arrogant, and Talbot classes of cruisers, will have been completed by the end of the present financial year, except in the case of the Eclipse, for which provision is made in these Estimates.

In my Memorandum of December 6 last, I stated that the Board had decided to appoint a Special Committee on Designs to assist them and the Director of Naval Construction in the consideration of certain questions to be submitted to it by the Board in connection with the features of the future designs of different types of fighting

ships. I have now to report the Committee has been constituted as follows, and is at work:—

Admiral Sir John Fisher, G.C.B. (President).
Rear-Admiral H.S.H. Prince Louis of Battenberg, G.C.B., G.C.V.O., A.D.C.
Engineer Rear-Admiral Sir John Durston, K.C.B., Engineer-in-Chief of the Fleet.
Rear-Admiral Alfred L. Winsloe, C.V.O., C.M.G.
Captain Henry B. Jackson, F.R.S., R.N.
Captain John R. Jellicoe, C.B., R.N.
Captain Reginald H. S. Bacon, D.S.O., R.N.
Captain Charles E. Madden, M.V.O., R.N.
Mr. Phillip Watts, LLD., D.Sc., F.R.S., Director of Naval Construction.
The Right Hon. the Lord Kelvin, O.M., G.C.V.O.
Professor J. H. Biles, Glasgow University.
Sir John Thornycroft, F.R.S., D.C.L.
Mr. Alexander Gracie (Fairfield Shipbuilding Co.).
Mr. R. E. Froude, F.R.S., Superintendent of Admiralty Experiment Works, Haslar.
Mr. W. H. Gard, M.V.O., Chief Constructor.
Commander Wilfred Henderson, R.N. (Secretary).
Mr. E. H. Mitchell, Assistant Constructor (Assistant Secretary).

The instructions to the Committee were drawn up by the Board after previous conference and consultation with the Commanders-in-Chief of the Channel and Atlantic fleets, Admirals Sir Arthur Wilson, V.C., K.C.B., and Lord Charles Beresford, K.C.B.

I may claim that the work of this Committee will enable the Board to ensure to the Navy the immediate benefit of the experience which is to be derived from the naval warfare between Russia and Japan, and of the resultant studies of the Naval Intelligence Department. I can, however, hold out no hope that it will be consistent with the interests of the public service to publish either the reference to the Committee or its report.

It is proposed to begin during the financial year 1905–6:— 1 battleship, 4 armoured cruisers, 5 ocean-going destroyers, 1 ocean-going destroyer of an experimental type, 12 coastal destroyers, 11 submarines.

His Majesty has approved that the battleship should be called the Dreadnought, and the first of the armoured cruisers the Invincible.

The sum devoted to the commencement of new ships in 1905-6

is a little over one and a quarter million pounds, and the Board have great hopes of successfully inaugurating a policy of shipbuilding by which, while fewer ships will be under construction at the same moment than has lately been the case, the period of the completion of a ship will be materially shortened from the present average of thirty to thirty-six months.

It is also proposed to ask Parliament to provide money for the commencement of a second Royal yacht. Her late Majesty had three yachts of different sizes, for all of which she had constant use. One of these yachts has been replaced by the Victoria and Albert, which, after encountering unfortunate vicissitudes on her first completion, is now established as a great success in yacht building. It is not proposed to replace the Alberta, but it is necessary that there should be a smaller yacht in addition to the big one, and, as the hull of the Osborne is worn out after thirty years of service and she can no longer be certified as safe for His Majesty's general use if he should require to visit any port of his dominions or any continental port into which the Victoria and Albert cannot enter, it is time that a new one should be commenced. A sum of £50,000 for the year's work has been inserted in these Estimates, subject to the approval of the House of Commons. The yacht will be put out to tender among a selected list of private firms.

The policy of sending ships to the private yards has fulfilled its object, and the arrears in the repairs of the Fleet have been mastered and are a thing of the past. It is not, therefore, necessary to provide next year for the repairs of any ships at the private yards, and henceforth it should be borne in mind that the first business of the Royal dockyards is to keep the Fleet in repair, and accordingly the amount of new construction allotted to those dockyards should be subordinated to this main consideration. We have now in the United Kingdom a splendid national asset in the numerous private yards, and experience has shown that, whereas new construction can certainly be as cheaply executed in them as in the Royal dockyards, all repairs are more economically effected in the Royal than in the private dockyards.

Considerable anxiety has been felt from time to time as to the possible exhaustion of the South Wales coal beds producing the coal most suitable for use in ships of war, and many suggestions have been made to the Board of Admiralty that they ought to purchase collieries and coalfields to be held as a reserve. The Report of the Royal Commission on Coal Supplies shows, however, that the resources of such coal still remaining unworked are so vast that the requirements of the Navy may be considered as provided for

for so many years to come that all anxiety upon the subject is removed.

The experiments in connection with the use of oil fuel still continue, but it is now quite certain that oil has taken its place as part of the fuel of the Navy, and every arrangement is being made for its supply, storage, and distribution.

Distribution of the Fleet.

As a logical consequence of the policy explained in my Memorandum of December 6 last, it has become possible to effect considerable economies in some of the dockyards outside the United Kingdom. Accordingly, those at Halifax, Esquimalt, Jamaica, and Trincomalee will be reduced to cadres, on which the expenditure in the time of peace will be small, but which can in time of war be at once developed according to necessity. The expenditure at Ascension will also be reduced.

In that Memorandum I made no allusion to the distribution of torpedo craft, and I have now to report that in completion of their programme of re-distribution it has been decided by the Board to appoint a Rear-Admiral in place of a Captain to be in general charge of all torpedo craft in Home waters under the Admiral commanding the Channel fleet. At Devonport and Portsmouth eight, and at Chatham four, torpedo-boats have been put into permanent commission, while flotillas of submarine boats are also in course of organisation.

Since the commencement of the year over one hundred vessels of various classes have been successfully commissioned in reserve, and the battleships and cruisers in commission in reserve at Devonport have made their first cruise and had their first gunnery and torpedo practice at sea under the Flag Officer in command of that reserve Squadron.

I append the usual statement of the work done in the past year by the various departments of the Admiralty.

SELBORNE.

February 14, 1905.

STATEMENT OF WORK, 1904–5, Etc.

Changes in the Composition of the Fleets.

Mediterranean.

The Battleship Squadron now consists of eight ships of the same (Formidable) class, the Queen and Prince of Wales having joined the Squadron and the six Duncan class having been transferred to the Channel Fleet.

The cruiser division has been strengthened by the addition of the Armoured Cruisers Suffolk and Lancaster, while the Armoured Cruiser Bacchante has been replaced by the Armoured Cruiser Leviathan, a vessel of a larger and faster type. With the Aboukir these three ships compose the Third Cruiser Squadron.

The second-class cruisers Naiad and Intrepid have been replaced by the Minerva and Venus, vessels of the same class. The Diana was relieved by the Astræa, and after refit relieved the second-class cruiser Arrogant. The Furious, a vessel of the same type as the Arrogant, has been replaced by the Juno. The Astræa was transferred to China on the arrival of the Lancaster, and the Hermione was withdrawn from the Station on the arrival of the Suffolk. The effect of this is to leave a homogeneous squadron of four second-class cruisers of the Talbot class.

The third-class cruisers Mohawk, Pioneer, Pyramus, Pandora, and Pegasus, and the torpedo gunboats Harrier, Hussar, Dryad and Speedy have been withdrawn from the Station and will be replaced by four of the new scouts when they are ready.

The number of destroyers on the Station has been brought up to forty by the addition of eight vessels of the new River class (Erne, Ettrick, Exe, Itchen, Foyle, Dee, Cherwell and Arun), and four 30-knot vessels (Angler, Lively, Sprightly and Quail).

The Hercules, third-class battleship, has been sent to Gibraltar as a hulk, to accommodate dockyard workmen.

North America and West Indies.

In consequence of the formation of the Particular Service (Fourth Cruiser) Squadron, mainly composed of cadets' and boys' training ships, great changes have been made in the North America Station. The first-class cruiser Ariadne has become the flagship of the new Squadron.

The second-class cruiser Indefatigable has been withdrawn.

The third-class cruisers Pelorus and Prometheus, which relieved

the Retribution and Tribune, will be transferred to the Cape and Australian Stations respectively; and the second-class cruiser Charybdis will shortly return to England.

The third-class cruiser Pallas, and the sloops Fantome and Alert have been paid off and laid up at Bermuda, and the yacht Columbine has been paid off and laid up at Halifax.

It is intended shortly to send out the new third-class cruiser Diamond to the Station; her commanding officer will carry out the duties of senior naval officer in the West Indies in the absence of the Particular Service Squadron.

The title of the Commander-in-Chief will in future be "Commander-in-Chief of the North America and West Indies Station and of the Particular Service Squadron."

Important changes have taken place in regard to the ships employed for training purposes, all the old vessels having been replaced by modern and efficient ships.

The first-class cruiser Hawke has replaced the masted cruiser Northampton as training ship for youths. The St. George, a first-class cruiser, has replaced the Calliope and Cleopatra, masted third-class cruisers of very old type, and is now employed as training ship for boys. The first-class cruiser Gibraltar has replaced the old second-class cruiser Iris, and the third-class cruisers Medea and Medusa training ships for boys. The second class cruiser Highflyer has replaced the old first-class armoured cruiser Aurora as training ship for cadets.

These four ships, together with the Ariadne, the second-class cruiser Isis, and the Diamond will form the new Particular Service Squadron, under the command of the Commander-in-Chief on the North America and West Indies Station, and will cruise in West Indian waters and Home waters, being based on Devonport.

China.

No change has taken place in the Battleship Squadron, which consists of four ships of the Canopus class with the Centurion.

The armoured cruisers Cressy and Leviathan have been relieved by the Hogue and the Sutlej.

The first-class cruiser Blenheim has been relieved by the Andromeda.

The second-class cruisers Talbot and Eclipse have been relieved by the Iphigenia and Astræa. The Thetis will be relieved by the Bonaventure, to be transferred to the China Station from the Pacific Station.

The third-class cruiser Fearless and the sloops Espiègle, Rinaldo, and Vestal have been withdrawn without relief.

The gunboats Tweed, Bramble, and Britomart, and the sloops Algerine, Phœnix, and Rosario have been paid off and laid up at Hong Kong.

The shallow draft steamer Widgeon has been sent out from England. There are now nine vessels of this type on the Station and employed on Chinese rivers.

The destroyer Sparrowhawk struck a sunken rock near Shanghai on June 17, and became a total loss. Of the eight destroyers on the Station it is intended to keep six in commission and two with nucleus crews.

Australia.

The Squadron has been strengthened by the addition of the new second-class cruiser Challenger, and part of her naval crew is being gradually replaced by the entry of Colonials.

The second-class cruiser Encounter will be added to the Squadron about the middle of the year.

The third-class cruisers Tauranga, Ringarooma, and Boomerang have been withdrawn from the Station.

The Phœbe, Mildura, and Katoomba are in commission as drill-ships.

The third-class cruiser Pylades will shortly be relieved by the Prometheus, a vessel of a more modern type, and the sloop Mutine by the Pegasus (third-class cruiser).

East Indies.

The third-class cruiser Pomone has been relieved by the Proserpine, a vessel of the same type.

The third-class cruiser Porpoise has been paid off at Bombay, and the sloop Merlin has been withdrawn.

Cape of Good Hope.

The third-class battleship Simoom (formerly called Monarch), which was employed as guardship at Simons Town, has been withdrawn.

The first-class cruiser Gibraltar has been relieved by the Crescent, a vessel of the same class.

The third-class cruiser Pearl, the gunboat Partridge, and the sloop Odin have been paid off and laid up at Simons Town.

The third-class cruiser Barrosa will shortly be replaced by the Pelorus, a larger and more modern vessel.

Channel Fleet.

The Home fleet has been renamed the Channel fleet, and has been greatly strengthened during the year. The battleships Resolution, Hood, Benbow, and Anson have been replaced by four battleships of the most modern type, the Exmouth and Russell (of the Duncan class), and the Triumph and Swiftsure, which were originally built to the order of the Chilian Government. The four Duncans from the Mediterranean have also been transferred to the Channel fleet, which which will now consist of two fast divisions, consisting of six Duncans and two Swiftsures, and one slower division consisting of four Royal Sovereigns, to be subsequently replaced by four Majestics from the Atlantic fleet.

In addition to the First Cruiser Squadron two smaller cruisers, the Dido (second-class) and the Topaze (third-class), are now attached to the Fleet, to which will be added two of the new scouts when ready.

Atlantic Fleet.

This fleet, which was formerly called the Channel fleet, has been strengthened by the addition of two battleships, and now includes eight battleships of the Majestic class. Four of these ships will shortly be relieved by the first four ships of the new King Edward VII class, and will then be transferred to the Channel fleet to replace the four Royal Sovereigns, vessels of an older and slower type.

The Second Cruiser Squadron has been affiliated to the Atlantic fleet, and in addition two cruisers, the Doris (second-class) and the Amethyst (third-class), are attached for scouting and despatch work, to which will be added two of the new scouts when ready.

The First and Second Cruiser Squadrons.

The First Cruiser Squadron, which was previously an independent command, and known as the Cruiser Squadron, is now affiliated to the Channel fleet. It has been temporarily reduced by one ship, and now consists of five armoured cruisers, the Good Hope (flagship) and four Monmouths.

A fifth cruiser of the same class, the Lancaster, will be added as soon as one of the new Devonshire class is ready to relieve her in the Mediterranean.

The Second Cruiser Squadron is formed of the Drake (withdrawn from the First Cruiser Squadron), two armoured cruisers from the Channel fleet, and the two first-class cruisers from the Atlantic fleet, the crews of which turned over to the armoured cruisers Cornwall and Cumberland.

The Squadron is thus made up of one Drake and four Monmouths, and will be increased in June by the addition of a sixth armoured cruiser, the Suffolk. From February 1 the Squadron will be under the command of a Rear-admiral, who will fly his flag in the Drake, and will be affiliated to the Atlantic fleet.

Home Ports.

The first-class cruisers Endymion and Theseus have relieved the old armoured cruisers Immortalité and Undaunted as gunnery training ships, and the first-class cruiser Grafton will shortly replace the old armoured cruiser Narcissus for similar duty.

The first-class cruiser Royal Arthur will replace the old second-class cruiser Mercury as navigational school ship.

The stationary training ship Lion has been paid off.

The Fleet Reserve has been abolished, and all ships which would formerly have been placed in that reserve are now kept in commission with nucleus crews.

A Rear-admiral has been appointed at each port in command of the commissioned ships in reserve.

Coast Guard and Fishery Service Ships.

The second-class cruisers Brilliant and Scylla have replaced the Apollo and Andromache as sea-going Royal Naval Reserve drill ships, and the Melampus will shortly be relieved by the Latona. These vessels are to cruise in future with the Channel fleet during one month in each quarter.

The special service vessels Hearty and Jackal have been relieved by the Barham (third-class cruiser) and the Harrier (gunboat) for fishery duties.

The gunboat Onyx has been relieved by the gunboat Dryad.

The gunboat Hussar has replaced the Antelope as drill ship at Portishead.

Manœuvres.

In May the combined Mediterranean and Channel fleets and the Cruiser Squadron carried out exercises in the Mediterranean, and in August the Home and Channel fleets and the Cruiser Squadron, together with the sea-going Royal Naval Reserve drill ships and seven specially commissioned battleships, took part in combined tactical exercises in Home waters.

At the same time all available torpedo craft and submarines and special service vessels on the Home station were engaged in manœuvres in the Irish Channel.

Personnel.

Officers.

The new scheme of training of officers and men has been systematically carried out during the year 1904.

The Royal Naval College at Osborne has been developed as the cadets entered term by term, and the scheme has worked so far to the complete satisfaction of the authorities. A report was made by two independent inspectors at the end of the first year upon the course of teaching followed, and they expressed full approbation of it. A similar report was made in the autumn by two engineering authorities upon the course of engineering training laid down, and the same satisfactory report was received.

Steps have been taken to prepare for the opening of the new Cadets' College at Dartmouth, and the present Headmaster of Osborne College has been selected for the same appointment at Dartmouth.

A new scheme for the training of officers in signalling has been drawn up, and instructions have been issued on the subject.

The war courses for officers are being revised and extended. A course for lieutenants has been established. A limited number of marine and military officers are allowed to attend these courses.

The regulations with regard to the full pay leave of officers serving on foreign stations have been revised.

The regulations for the training of engineer cadets under the old system have been revised, so as to permit of the entry in the Royal Naval College at Keyham of a certain number of students over and above the number required during the few years remaining under that system.

The regulations for the entry of assistant clerks have been revised, and an arrangement has been made tentatively for sending successful candidates abroad to study foreign languages before being appointed for duty in the Fleet.

Men.

The training of boys and youths has undergone certain modifications during the year. In substitution for the Iris, Medea, and Medusa, which had been detailed for the sea-going training of boys on leaving the stationary training ships, two large cruisers of the Edgar class have been now appropriated for the purpose, and these vessels will return about every four months for the purpose of taking fresh drafts of boys for training. In the case of the youths, a system was introduced early in the year under which the recruits were first of all put through a short systematic course of instruction in the

depôt at Chatham before being sent to sea in the Northampton. As a consequence of later changes in the ships maintained in commission, the youths will in future be put through a preliminary training at one of the training establishments under the Inspecting Captain, and then sent to sea for four months in a cruiser of the Edgar class.

The entry of boy artificers by competition at the open examinations for dockyard apprentices not having been entirely satisfactory, an arrangement has been concluded with certain local educational authorities in the United Kingdom by which they will nominate a limited number of boys considered physically and educationally fit for the Service. It is hoped by this means to obtain recruits from among the sons of the skilled artisans in the engineering and manufacturing districts.

The scheme of gymnastic training introduced in 1904 has been developed and extended. Special care has been taken to carry it out systematically among the younger recruits.

The output of gunnery ratings from the gunnery schools being insufficient to meet the demands of the Fleet, it was decided to organise a special course of training men as seamen gunners and gunlayers in the larger ships afloat. The men so trained are now being put through a final course in the gunnery schools. It is hoped that by next year the schools will be able to meet all the demands made upon them.

The entry of non-continuous service seamen and stokers has quite come up to the expectations, and it is believed that such men will be a useful addition to the class of men hitherto recruited for the Fleet. In order, however, to give recruits some general knowledge of their duties before being drafted to ships, it has been lately decided to put the seamen ratings through a short course of training at the depôts before being drafted to sea-going ships; the stokers are already undergoing a course.

Fresh facilities have been given for the transfer of men from one rating to another. The number of stokers required being still in excess, seamen and marines have been invited to volunteer for transfer to stoker, and a considerable number of men have complied.

Special arrangements have been made for the employment of men in submarine boats, so as to prevent the inconvenience of losing the experience of trained men by the ordinary drafting process while the number of boats is increasing.

Great attention has been given to the training of signalmen in the Fleet, and special instructions have been issued on the subject.

The system of signal instruction for all men entering the Coast Guard is now in full operation in the signal school at Portsmouth

and it is expected that it will add greatly to the value of the Coast Guard in this respect.

The Manual of Seamanship for the use of boys and men in H.M. Fleet has been re-written and brought up to date, and will shortly be issued.

The regulations governing discharge by purchase have been revised and one scale established for both the Royal Navy and the Royal Marines. Facilities have also been afforded to men to join the Royal Fleet Reserve.

Recruiting has been very successful this year, the total number required having been obtained by the end of December.

For the first time in recent years the full number of engine room artificers has been obtained; in fact, more than the required number for the whole year had been entered in the first six months.

The Reserve of Accountant Officers has been established, and favourable reports have been received upon the officers who were embarked for training in the Fleet during the summer months.

The Sick Berth Attendants Reserve is making steady progress, though the numbers recruited have not been so great as was hoped. Endeavours are being made to obtain recruits from Scotland and Ireland. Forty-three men went through a week's training on board ship in the course of last summer.

Royal Marines.

Free rations (bread and meat and groceries) have been granted to Marines serving on shore, so that they are now on the same footing as the seamen in this respect.

The additional allowances, chiefly dependent upon efficiency, to which reference was made in the last Statement, have given great satisfaction, and have produced marked improvements, particularly in rifle shooting.

The gunnery allowances of Royal Marines have been assimilated to those of petty officers and seamen, and have already been productive of good results. The opening of the non-substantive ratings of turret gunlayers and turret sight-setters to Marines may be expected to excite still further emulation amongst the best men of the corps to train and qualify for these ratings.

Gunnery badges similar to those worn by seamen are now issued to Royal Marines.

Regulations have been issued for improving the military training of Marines when serving afloat. Greater attention is being given to the training of Marines at the divisions in Morse and semaphore, as well as in military signalling.

The new Royal Naval School of Music has made considerable progress, and has outgrown the available accommodation at Eastney Barracks, where it has been temporarily located. The earlier training is, therefore, now carried out at the various headquarters of the Royal Marines. On disembarkation bandsmen will return to these divisions in the same manner as other ranks of the corps, and the school at Eastney has been made the depôt school to complete the men's training, and to form them into bands for embarkation.

The total strength was about 700 of all ranks at the end of December.

Twenty-one bands under the new scheme are now embarked in H.M. ships.

NAVAL RESERVES.

As anticipated in last year's Statement, much larger numbers of the Royal Naval Reserve men have come forward for embarkation for three months' training, and the accommodation in the sea drill ships proving insufficient, a number of seamen had to be sent to ships of the Home fleet, which, as a rule, only take men of the qualified seaman class.

This shows the growing popularity of the Royal Naval Reserve generally, attributable, no doubt, to improvements made in the conditions of service and more convenient facilities for training being given, especially the sea drill ships.

Recruits have come forward in such large numbers that the full strength voted for the various ratings was practically reached by the end of November, 1904.

Fifteen hundred and eighty-six executive officers were borne on the 1st December, 1904, the numbers voted for 1904–5 being 1600.

The following numbers of qualified candidates are on the list of applicants:—

For Sub-Lieutenant	153
For Midshipman	89
Total . .	242

The numbers now undergoing naval training in H.M. ships are:—

	Lieuts.	Sub-Lieuts.	Mids.	Total.
Twelve months' training .	34	41 (39 as Acting-Lieutenant).	14 (All as Acting Sub-Lieut).	89
Gun and Torpedo courses .	13	29 (25 as Acting Lieutenant).	1 (As Acting Sub-Lieut).	43

Three hundred and sixty-six officers on the active list have already undergone this training, and are in receipt of training fees.

Of commissioned engineer officers there are now borne 352.

Of the warrant engineers voted for 1904–5, twenty-five have been entered. The numbers obtained by direct entry in this class are not so large as anticipated, but it is hoped to advance a certain number from amongst the engine room artificers, who are recommended for promotion during their training in H.M. ships.

The following commissioned officers have completed, or are undergoing, courses:—

Senior Engineers	27
Engineers	81
Assistant Engineers	29
	137

The numbers of reserve men borne on December 31, 1904, as compared with those voted for 1904–5, and borne in former years, are:—

Class.	Voted.	Borne.		
	1904 5.	31.12.04.	31.12.03.	31.12.02.
Leading seamen	150	90	—	—
Qualified seamen	11,650	11,967	5,178	4,298
1st class (old system)			6,020	6,472
Seamen	11,000	10,123	6,374	5,572
2nd class (old system) . . .			3,900	4,273
Engine Room Artificers. . .	600	604	31	—
Firemen	5,200	5,815	4,540	4,033
Special Fireman Class . . .	1,000	939	10	—
Totals	29,600	29,538	26,048	24,648

Two thousand three hundred and sixty-two qualified seamen and seamen, as compared with 1522 last year, have embarked in H.M. ships for training as well as of the new ratings, 428 E.R.A.'s and 710 special firemen.

By November last the numbers of the Colonial Royal Naval Reserve were:—

Australia.	148
Newfoundland	511
Malta	344

Royal Naval Volunteer Reserve.

On December 1, 1904, the strength of the Royal Naval Volunteer Reserve (exclusive of the instructional staff) was 3053.

The Buzzard has taken up her moorings in the Thames as drill ship for the London division, and the Melita has been offered for a similar purpose for the Mersey division.

The rank of commander has been instituted for officers commanding divisions, and officers commanding companies have been advanced to the rank of lieutenant.

Officers have been permitted to undergo short courses of gunnery training at Portsmouth, and approval has been obtained for their receiving pay and travelling allowances on such occasions.

A certain number of men have been allowed to undergo a course of signal instruction at Portsmouth, and have shown great aptitude in making themselves efficient.

GREENWICH HOSPITAL.

Northern Estates.

Farms.—The season of 1904 having proved more favourable for agriculture than that of 1903, it has not been necessary to continue the abatements in rents of the arable farms which were granted in 1903.

All the farms are let.

The purchase of the estate of Low Crossgill, comprising about 268 acres, for a sum of £6000, was completed in February last. The estate adjoins the Greenwich Hospital farm of Cashburn, to which it forms a very desirable addition, as it affords shelter for the flocks in severe weather. It has been let to the tenant of that farm.

In August the purchase of the estate of Priorsdale, adjoining the Greenwich Hospital farm of Shawside, was completed. The estate comprises an area of about 1830 acres, including about 250 acres of well grown and marketable timber. The purchase price, inclusive of the timber, was £9750.

The acquisition of this estate is likely to prove of great advantage as it contains the reservoir on which the whole of the mines along the valley of the Nent are dependent for their water supply.

Greenwich Estate.

Considerable progress has been made in bringing the property into a proper state of repair, and enforcing the dilapidation covenants in leases. The better class of shop property is being modernised and improved as opportunities permit.

The sum of £11,410 has been awarded to the Admiralty by the arbitrator appointed to decide the amount to be paid as compensation by the London County Council for the loss of tolls at Greenwich pier caused by the construction of the Greenwich and Millwall Tunnel.

ORDNANCE.

No provision for re-arming ships is required in 1905–6, and the requirements of the Fleet in commission can be largely met from stores surrendered by older types of ships. It has thus been possible to reduce this Vote, while at the same time making full provision for ships building.

Guns and Mountings.

The manufacture and issue of guns have been satisfactory during 1904–5, all requirements for re-armaments and new construction having been met.

Additional 7·5-in. B.L. guns have been provided for vessels of the Devonshire class, and the number of 6-in. guns reduced.

12-in. 45-calibre and 9·2-in. 50-calibre B.L. guns are being provided for the battleships, and 9·2-in. and 7·5-in. 50-calibre guns for the first-class cruisers in the 1904–5 programme. Provision has been made in the Estimates for 1905–6 to begin the manufacture of these guns.

Exhaustive experiments upon night sights have resulted in obtaining a good optical sight which will be adopted in the more important gun mountings.

A new type of armour-piercing projectile, from which greater penetration can be obtained, has been satisfactorily tested, and is being introduced for all guns of 6-in. and higher calibre.

An alteration in the proportion of reserves of all transferable gun mountings has relieved the congestion in the gun mounting stores.

Increased gun mounting accommodation is being arranged for at Gibraltar and Hong Kong.

The gun mounting store at Chatham has been completed and is now in use.

Instructional Armaments.

The drill batteries at the naval barracks at Portsmouth and Chatham have been equipped and are now in full use, and the necessary alterations to the Devonport battery will be, it is hoped, concluded during the present financial year.

A powerful armament of 6-in. B.L. VII guns have been arranged for the two new Cunarders now in process of construction.

Ordnance Depôts.

Reductions have been effected in the crews of naval ordnance vessels, and further reductions will be made if practicable.

The accommodation for naval ordnance stores at Bombay has been increased.

Additional storage accommodation for naval ordnance stores and improved facilities for rapid issue of the stores to ships are being provided at Malta.

Similar additions and improvements are in hand at Gibraltar, and will be provided at Hong Kong.

Torpedoes.

The fleet torpedo practice established at the end of last year has been very successful. It is more realistic and interesting than previous torpedo practice, and the percentage of hits to torpedoes run has been good.

Improvements in submerged discharges and torpedo rooms are being effected to enable more rapid loading to be carried out.

A new torpedo with increased range and speed has been designed and is now under trial on the torpedo range at Portland.

Searchlights.

Searchlights have been improved by the general introduction of automatic lamps. Experiments are also being carried out at sea with electrically controlled projectors.

Wireless Telegraphy,

All ships from first-class battleships down to third-class cruisers are being fitted with wireless telegraph apparatus.

COALING OF THE FLEET.

The large floating coal depôt, equipped with electrical transporting machinery, has been delivered at Portsmouth.

Further attention has been given during the year to the addition of other types of craft to facilitate coaling operations, and also to the provision of reserves of patent fuel at certain coaling stations abroad.

Further progress has been made with experiments for coaling H.M. ships at sea; the trials will be continued.

NEW CONSTRUCTION.

Battleships.

The expectations in the last Statement as regards the battleships to be completed and passed into Fleet Reserve in 1903–4 were realised.

All these six vessels, viz., four of the Duncan class, and two of

the Formidable class, have been completed and were put into commission either in 1903–4 or in the opening months of 1904–5.

Of the eight battleships of the King Edward VII class, building at the opening of the present financial year, the King Edward VII has already been commissioned, and the Commonwealth, Dominion, and Hindustan have satisfactorily passed through all their steam trials. Good progress has been made on the New Zealand, and this vessel will be completed about the middle of 1905–6. Of the three later vessels laid down at the close of 1903–4, the Britannia has been launched, and it is anticipated that all three will be completed according to programme in 1906–7.

Of the two battleships to be given out to contract in 1904–5 the Agamemnon is to be laid down by Messrs. Beardmore and Company, and is to be completed for commission in two years and nine months, and the Lord Nelson will be laid down by Messrs. Palmer and Company of Jarrow, and is to be completed in three years.

Armoured Cruisers.

The whole of the ten vessels of the Monmouth class have now been put into commission.

The six vessels of the Devonshire class, four of which were to have been completed in 1904–5, will be a little delayed, owing to the work involved in the substitution of two 7·5-in. guns with hydraulic mountings for the four foremost broadside 6-in. guns, and three of the class will be fitted for the use of liquid fuel.

The first two vessels of the Duke of Edinburgh class have been launched. In the remaining four vessels (Warrior class), the ten 6-in. main deck guns will be omitted and replaced by four 7·5-in. guns with hydraulic mountings.

Three vessels of a still larger class of armoured cruiser (Minotaur class) have been laid down in the dockyards. They will carry four 9·2-in. guns in pairs in end barbettes and ten 7·5-in. guns in single broadside barbettes. One of these vessels is being constructed with straight water lines in view of the opinion held by many naval officers that such an under-water form has some advantage at sea.

Second-Class Cruisers.

The Challenger has been commissioned, and the Encounter is expected to be complete early next year.

Third-Class Cruisers.

The four vessels of this class have passed successfully through their steam trials, and one has been commissioned. The three vessels

with reciprocating engines obtained an average speed of 22¼ knots. The Amethyst, fitted with turbine engines, reached a speed of over 23½ knots.

Scout Class.

The eight vessels of the scout class, which were under construction at the beginning of the current year, have made good progress. The whole of the eight should be completed in 1905–6, and it is hoped that some of them will be brought into service very early in that year.

Destroyers.

All the destroyers of the River type (18 in number), ordered previous to 1903–4 have been completed and delivered.

The fifteen of the same type ordered in 1903–4 are making good progress and should all be delivered during 1905–6.

Of the fourteen destroyers included in the current year's programme, one has been ordered from the Palmer Company. This vessel is in an advanced state of construction, having been built by the firm as a speculation. This vessel will be in all respects similar to the destroyers ordered of the firm by the Admiralty in 1903–4.

Submarines.

The orders for the ten submarines provided for in this year's programme have been placed. These are of the new B type.

Other Vessels.

The Admiralty yacht Enchantress, the two coast guard cruisers Squirrel and Argus, and the Widgeon, shallow draught steamer, have been completed.

MACHINERY AND BOILERS.

The Halcyon, torpedo gunboat, which has been re-engined and re-boilered with water-tube boilers of the Express type, associated with light quick-running engines, has completed her trials.

In the final report of the boiler committee, which has now been received, the policy recommended by the committee at first, of fitting a combination of cylindrical and water-tube boilers, with a reduced steam pressure, has been abandoned. Accordingly, in the battleships and cruisers of Lord Nelson and Minotaur classes, water-tube boilers only are being fitted; complete installations of Babcock and Wilcox or of Yarrow large tube type being selected for each of these ships.

The automatic forced lubrication arrangements which proved

successful in the torpedo-boat destroyer Syren are being fitted in the torpedo-boat destroyers Swale, Ure, and Wear. Forced lubrication is also being fitted to certain bearings of the new battleships' and cruisers' engines.

The conditions under which the contractors' steam trials are to be run, have been revised with a view to ensure that the conditions as regards lubrication, adjustment, number of men employed, and the closing of watertight doors, etc., shall be in agreement with the conditions obtaining on service. Several ships have lately satisfactorily run their trials under these conditions.

In view of the satisfactory results obtained from some of the ships of the County class with a modified form of propeller, similar propellers have been provided for the whole of the class, and have been fitted to all except the Kent, whose new blades are at Chatham ready for fitting in place.

The Good Hope has also been fitted with propellers of a modified design, and has carried out a series of comparative speed runs.

Standardisation.

By co-operation with the machinery contractors, it has been found practicable to make almost the whole of the main and auxiliary machinery and boilers fitted in ships of the same class, of similar design and interchangeable, without diminishing the responsibility of the contractors concerned.

In the six first-class armoured cruisers of the Duke of Edinburgh class, this principle has been put into effect, and it is now in process of development for the machinery of ships of the Lord Nelson and Minotaur classes. By dealing with vessels in classes, it is thus arranged that progress is not retarded by standardisation.

Admiralty representatives having been associated with the various sub-committees of the Standards Committee, Admiralty and commercial practice has been assimilated in many features, with benefit to each.

Ice-making Machinery.

In view of the importance of ensuring a supply of ice in hot climates and under war conditions, the output of the ice-making machines on all new vessels has been much increased.

Electrical Plant.

As a consequence of the extension of the application of electrical motors for capstan engines, boat, coal and ammunition hoists, venti-

lating and forced draught fans, etc., the capacity of the electric generating plant fitted in new vessels has been greatly increased, and additional dynamo engines have been fitted in several battleships of the Majestic, Royal Sovereign, Canopus, and Formidable classes, and are to be fitted in other vessels of these classes, and in first-class cruisers of the Cressy class, as they come in hand for large refit.

Liquid Fuel.

Since last year the torpedo-boat destroyer Spiteful and the battleship Prince George have been fitted with oil burning installations; the former burning liquid fuel solely, and the latter burning oil either alone or in conjunction with coal. Comparative trials between the sister torpedo-boat destroyers Peterel and Spiteful have also been made.

The battleships Mars and Hannibal and the cruiser Bedford have been in commission continuously during the past year, with freedom from defect in their oil burning installations, which are fitted for burning oil alone or mixed with coal in a portion of their boilers.

WORK AT THE DOCKYARDS.

By the end of the current financial year all the large repairs arranged to be done by contract will be completed, and the arrears of this work, which had accumulated owing to the pressure of other important services in the dockyards, quite cleared off. It is not anticipated that there will be any necessity to resort to the private trade for any considerable work of this character in 1905-6.

The development of Gibraltar Yard as a repairing base for the new Atlantic Fleet has been facilitated by the transfer there of some of the equipment not now required at other yards abroad, while the officers and subordinate staff have been mainly recruited from the same source. About fifty skilled workmen are being sent to Gibraltar from Home yards.

Good progress is being made with the work of installing electric light and power in the dockyards and other naval establishments. Most of the contracts for the various sections of the work have been placed, and the preparatory arrangements for the balance of the work are well advanced.

The replacement of obsolete machinery in the various dockyards, etc., by machines of modern design and construction, is proceeding satisfactorily.

Large Repairs.

The following ships have been or will be completed:—By dockyards: *Battleships*—Majestic, Prince George, Magnificent, Repulse, Renown, Trafalgar, Nile, Barfleur. *First-class Cruisers*—Sutlej, Blenheim, Theseus, Edgar. *Second-class Cruisers*—Gladiator,* Vindictive,* Diana,* Talbot,* Minerva.*

By Contract:—*Battleships*—Canopus, Goliath, and Glory (at Hong Kong). *First-Class Cruiser*—Argonaut. *Second-Class Cruiser*—Highflyer.

The most important of the refits to be carried out during 1905–6 are:—

Battleships—Hannibal, Illustrious, Mars, and Jupiter (work commenced in 1904–5).

First-Class Cruisers—Bacchante, Aboukir, Cressy, Amphitrite, Hawke, Gibraltar, and Royal Arthur (work commenced in 1904–5).

Second-Class Cruisers—Eclipse (including change of armament), Furious, Arrogant, Charybdis, Hermione, and Cambrian (work commenced in 1904–5).

NEW WORKS.

Works Provided in Estimates.

Chatham.—The extension of electrical shop, and the extension of store for tubes for water-tube boilers have been completed. The conversion of Nos. 3 and 4 slips into boat store will be completed in 1905–6. It has been decided not to proceed with the additional Fleet Reserve workshop at Portsmouth provided for in annual Estimates, 1904–5.

Sheerness.—Drainage improvements and new fitting shop will be completed this year.

Portsmouth.—The new pumping station at Docks Nos. 7 and 10, the new chain cable store, the connections, etc., to new 20-in. water mains, and the extension of No. 13 Dock will be completed this year. The new steam factory will practically be completed in 1905–6.

The work of providing accommodation and storage in connection with submarines is progressing.

Devonport.—The Chief Engineer's drawing office, etc., North Yard, has been completed. The railway lines round main storehouses, South Yard, the caisson for No. 2 Dock, and the renewals to water mains and fire service, North Yard, will be completed this year.

* Including change of armament.

Haulbowline.—The water main from mainland, houses for Constructor and Chief Engineer, and machinery and shop-fitting shop will be completed in the year.

Malta.—Progress is being made with the work of renewing wharf walls in French and dockyard creeks, the renewal of the buildings in connection with hydraulic dock will be completed this year.

Victualling Yards.—The slaughter house at Chatham has been completed, the cold meat store at Gibraltar, and the adaptation of War Department property for victualling purposes at Malta will be completed in 1905–6. The provision of accommodation for victualling stores, etc., at Sydney, is rendered unnecessary by the offer of the New South Wales Government to provide the necessary storage at their own expense.

Naval Barracks and General Fleet Services.—Work on the Commander-in-Chief's residence at Chatham has been begun, and should be finished in 1906–7. The Wei-hai-Wei canteen will be completed this year and the Portland canteen in 1905–6.

Marine Barracks.—The new church and re-organisation of drainage at Eastney; the improvements to married officers' quarters at Plymouth; the reading and recreation rooms, North barracks, and new church at Deal will all be completed in 1905–6.

The conversion of Melville Hospital into Marine barracks at Chatham, which could not be taken in hand in 1904–5, through the new hospital not being ready, will be completed in 1906–7.

Prisons.—The new warders' quarters at the Corradino Prison, at Malta, will be completed, and the prison on Garden Island, Sydney, early in 1905–6.

Hospitals.—The drainage improvements at Haslar have been completed. The new block for officer patients will practically be finished in 1904–5, and the adaptation and improvements of buildings in 1905–6. The improvements to three ward blocks at Plymouth will be completed in 1904–5, the wards for lunatics and prisoners in 1905–6, and improvements and alterations in 1906–7. The New General Hospital at Portland and additional accommodation at Queensferry will be completed in the year, and the re-construction at Hong Kong early in 1905–6. The additional accommodation and improvements at Gibraltar will be continued in 1905–6. The sanatorium at the Cape will be finished in 1905–6.

Osborne.—The new cadets' college will be finished in 1905–6.

The principal new works in 1905–6 are :—

Chatham.—Chain testing house; improving and extending dockyard water supply; and alteration to railways at heads of Nos. 5 to 8 Docks.

Portsmouth.—Alteration to No. 5 Dock, and quarters for sub-lieutenants and captain (Whale Island).

Devonport.—New buoy house, and new machine shop, Mutton Cove, South Yard.

Pembroke.—New machine workshop.

Deal.—Canteen for East barracks.

Malta.—New reservoir, and new store houses at Corradino.

Generally.—Provision and accommodation and storage in connection with submarines, and storage for lubricating oil.

Progress under the Naval Works Loan Acts.

Enclosure and Defence of Harbours.

Gibraltar.—The Admiralty mole extension and the detached mole are completed and in use. The dredging of the harbour is completed except opposite the dam. The commercial mole will be shortly completed.

Dover.—The Admiralty Pier extension, the east arm and the east reclamation are all completed, except the above-water work at the extremities of the breakwaters. The south breakwater has been commenced, and a short portion at the east end is up to water level.

Malta Breakwater.—The work has been greatly delayed by a succession of mishaps to the contractor's plant and staging, in particular to damage caused by two gales.

Adapting Naval Ports, etc.

Keyham Dockyard Extension.—Docks 4, 5 and 6 are all nearly finished now. The entrance lock is now well in hand. Closed Basin—Excavation about two-thirds completed. Tidal Basin—Excavation about one-half completed. Main Wharf Walls—Completed with the exception of some of the columns.

Gibraltar Dockyard Extension.—No. 3 Dock (King Edward VII Dock) is completed and available for docking ships. The dimensions of the dock are—Length, 450 ft.; width of entrance, 95 ft.; depth on sill at low water, 35 ft. 6 in. The provision of residences for the officers and artificers of the yard has been begun.

Hong Kong Dockyard Extension.—The reclamation in front of the Naval Yard and War Department properties is nearly completed. The wharf walls of the new basin are practically finished. The dock is in progress.

Simon's Bay Dockyard Extension.—The breakwater and the walls enclosing the new basin are in hand. The reclamation is in progress, and the main dam for the dock is nearly closed.

Malta Dockyard Extension.—Progress on the two new docks being built by contract has not been at all satisfactory, the work at present being practically at a standstill, owing to the breakdown of the contractor's pumping plant. The subsidiary works are being proceeded with as fast as the slow progress on the main contract will permit.

Coaling Facilities.

Malta.—All the property necessary for coal storage has now been acquired; the required improvements are being carried out.

Gibraltar.—The coal island is nearly finished and is partly in use.

Portland.—Good progress has been made with the work of extending the present coaling jetty, which is about half done. A commencement has also been made with the oil-fuel storage, a contract having been let for two tanks.

Deepening Harbours and Approaches.

Portsmouth.—About 3 feet more have still to be dredged at the outer and inner bars. One more berth has been dredged and one other is nearly finished. The work on cruiser berths in Fountain Lake is being proceeded with as fast as possible; the second group of three is now about half done. The deepening of the channel abreast of the Assistance berth is done, and the entrance to Fountain Lake has been widened.

Devonport.—The new dredger for which provision was made has been purchased and is now at work at Devonport.

Buildings, etc.

Britannia R.N. College.—The main college will be available for the naval cadets, who will enter into occupation in September, 1905. The subsidiary buildings, etc., are being pushed forward with all expedition, and satisfactory progress is being made.

Gibraltar.—The enlargement of the Dutch shell stores is nearly complete, and rapid progress is made with the magazines at the east of the Ragged Staff.

Magazines.—The work on increased magazine accommodation at Chatham, Devonport, Malta, and other places is progressing steadily, and land has been bought near Gosport for the erection of magazine accommodation to relieve Priddy's Hard.

Chatham Hospital.—Will be ready for occupation by the end of the year.

Electric Light and Power in Naval Establishments.—Contracts

have been let for the generating stations at Chatham, Sheerness, Portsmouth, Devonport, Bull Point magazines, Shotley, Gibraltar, Malta, and Cape temporary station, and work is in hand.

Sheerness Depôt for Torpedo-boat Destroyers.—Work is well in hand, and tenders for the following works have been let, viz.:—Extension of Nos. 4 and 5 docks, trenches for air mains, conversion of mast house, etc., into fitting shops, distilled water mains, caisson at basin entrance, electric shop, mast shed, etc., alterations to dock pumping station, Navy well, new engine and boiler house. Good progress is being made on these contracts, and several minor works have been completed.

S.

February 14, 1905.

Memorandum of First Lord on the Distribution and Mobilisation of the Fleet.

THE Board of Admiralty have decided to make certain changes in the distribution of the Fleet and in the arrangements for its mobilisation, the nature and reason of which I desire to explain.

A new and definite stage has been reached in that evolution of the modern steam navy which has been going on for the last thirty years, and that stage is marked not only by changes in the *matériel* of the British Navy itself, but also by changes in the strategical position all over the world arising out of the development of Foreign Navies. In the Western hemisphere the United States are forming a Navy the power and size of which will be limited only by the amount of money which the American people choose to spend on it. In the Eastern hemisphere the smaller but modern Navy of Japan has been put to the test of war and has not been found wanting. The Russian Navy has been greatly increased, and (with the exception of the fleet in the Black Sea) has been wholly transferred or is in course of being transferred from the Baltic to the Pacific. The Navies of Italy and Austria-Hungary maintain their position in the Mediterranean, but they have not been the subject of such increased expenditure as those of other Powers. The French Navy stands, as always, in the fore-front. The new German Navy has come into existence; it is a Navy of the most efficient type and is so fortunately circumstanced that it is able to concentrate almost the whole of its fleet at its home ports.

In the British Navy all the older battleships have been replaced by modern ones, so that it may now be said that all the battle fleets in commission are composed of modern battleships. This fact in itself marks a distinct stage in the evolution of the *matériel* of the Navy; but still more significant and far-reaching in its consequences is the fact that this country is now rapidly becoming possessed of a number of modern armoured cruisers. When the Devonshire class are completed during the course of next year there will be in commission or in the reserve 4 Drakes, 6 Cressys, 10 Monmouths, 6 Devonshires, or in all 26 armoured cruisers. These are not all perfect ships and many subsequent improvements can be made in the types represented, but they are nevertheless a great advance on anything which has preceded them, and they bring in their wake a revolution in respect of the composition of our Cruiser Squadrons.

The features in these ships, that differentiate them from anything that has preceded them, are their great speed, which enables them at will to overtake any vessel of inferior speed or to escape from any vessel of superior power, their armour, which gives security to the men who fight the guns and to the vitals of the ship, and their armament, which in some cases is as powerful as that of the older battleships. With such ships even the best so-called "protected" cruisers would engage at a considerable disadvantage, and the slower or smaller "protected" cruisers and all unprotected cruisers would be hopelessly outmatched; their only hope of safety would be in flight, and they could not flee because they have not the necessary speed. The revolution has come suddenly; four years ago there was not one such ship in commission; within a year from this time the number in commission or in the Reserve will be twenty-six.

The principles, on which the present peace distribution of His Majesty's ships and the arrangement of their stations are based, date from a period when the electric telegraph did not exist and when wind was the motive power, and it is a wonderful testimony to the strategical and political soundness of those principles that they have stood the test of time and met all the needs of the Service up to the present moment.

In the opinion of the Board of Admiralty, however, the new conditions described above have necessitated a review and readjustment of this distribution of ships and arrangement of stations.

In the study of this question the Board have endeavoured to benefit by the experiences of the Navies of Japan and of Russia in the present war, and by the same light to review the principles on which the different classes of modern war-ships are constructed and the features embodied in them. In order temporarily to assist the Board and the Director of Naval Construction in the elucidation of the problems involved it has been decided to appoint a special Committee of Designs which will be composed of naval officers and scientific and professional experts and will begin work early next year, the Board of Admiralty first laying down as a basis what they consider to be the fighting requisites of the desired types of war vessels and the governing features of each type to which the other features shall be subservient.

They have also at the same time endeavoured to overcome certain difficulties with which they have long been confronted in matters of mobilisation. It will have been noticed that, whenever a portion of the Fleet has been specially commissioned for manœuvres, the only difficulties which have occurred during these manœuvres have been in connection with the ships so specially commissioned. The

arrangements in connection with the *personnel* have worked smoothly and quickly and the ships have been commissioned and have proceeded to sea within the specified number of hours, but during the manœuvres the number of small mishaps in connection with the machinery of the specially commissioned ships has always been much in excess of that of the ships in commission. There has, however, never been any mystery as to the cause of this distinction. During the great expansion of the Fleet which has been taking place for the last fifteen years the Board of Admiralty have never been able to retain at home a proportion of the *personnel* of the Navy sufficient to keep the ships of the Fleet Reserve in such perfect condition that on mobilisation for war they could feel confident that there would be no mishaps to the machinery on first commissioning, nor have the newly commissioned crews had sufficient opportunity to acquaint themselves with the innumerable details which go to make up what may be called the individuality of the ship. Year after year the Board have endeavoured to remedy this evil by proposing to Parliament large additions to the *personnel* (additions which Parliament has freely granted), but the increase in the number, size, and horse-power of the ships in commission has more than swallowed up the increase in the *personnel*, and consequently an adequate provision for the ships in the Fleet Reserve has not yet been made. It is not to be supposed that the importance of this matter has for one moment escaped the attention of the Board; the mishaps referred to are almost always such as can be repaired in the course of a few days, certainly always in the course of a few weeks; but it is not possible to exaggerate the importance of having the whole of the Fleet ready for war in the sense of being ready to deal an immediate blow—of having ready, in short, an instrument which in its every part will command the confidence of the Admirals who have to use it, and of assuring the Admirals in their turn that they have in their hands an instrument which will in no single point fail them. Hitherto, moreover, the firing practice of mobilised ships has left much to be desired; but as the guns crews had not previously been associated together, more could not have been expected.

The Board have endeavoured, and I believe successfully, to deal with these questions simultaneously. The ideals which the Board of Admiralty have always had before them have been that the peace distribution of the Fleet should be also its best strategical distribution for war, and that the mobilised ships should be in as perfect a condition of fitness for war as the commissioned ships. They now hope while maintaining the first ideal to realise the second, and at the same time to withdraw as far as possible from peace commission

those vessels which, however useful in peace, would in war be found to be of inferior fighting efficiency or even a source of weakness and anxiety to the Admiral.

The present Home Fleet will change its name and henceforth be called the Channel Fleet. It will have its headquarters at home and will consist of 12 battleships and a sufficient number of attendant cruisers. It will be commanded by a flag officer of the rank of Admiral, or, if he has not yet arrived at that substantive rank, of the acting rank of Admiral; the second in command will be a Vice-Admiral, the third a Rear-Admiral.

The present Channel Fleet will be renamed the Atlantic Fleet, and will be permanently based on Gibraltar. It will consist of 8 battleships and a sufficient number of attendant cruisers. The flag officer in command will henceforward be styled "Commander-in-Chief of the Atlantic Fleet," and he will be a Vice-Admiral or hold the acting rank of Vice-Admiral; the second in command will be a Rear-Admiral.

Affiliated to the Channel and Atlantic Fleets will be Cruiser Squadrons, each under the command of a Rear-Admiral, and consisting of six armoured cruisers. The First Cruiser Squadron will be affiliated to the Channel Fleet, and the Second Cruiser Squadron to the Atlantic Fleet. These cruiser squadrons will however be detachable from the fleets to which they are affiliated either for special cruiser exercises or for special cruises.

Under this arrangement the present separate South Atlantic Squadron will be no longer required and will disappear.

The Mediterranean Fleet will consist of eight battleships with a sufficient allowance of cruisers. It will, of course, remain based on Malta, and the Commander-in-Chief will be of the rank of Admiral or hold the acting rank of Admiral; the second in command will be a Vice-Admiral. The large cruisers attached to the Mediterranean station will be known as the Third Cruiser Squadron; they will be commanded by a Rear-Admiral, and will be occasionally detached for the same special reasons as in the case of the other squadrons.

All the repairs of the Channel Fleet will be done in the Home dockyards, those of the Atlantic Fleet at Gibraltar Dockyard, and those of the Mediterranean Fleet at Malta Dockyard; the aim of the Board will be to insure that in the case of the Channel Fleet never more than two battleships, and of the Atlantic and Mediterranean Fleets never more than one, shall be in dockyard hands at the same time.

The Atlantic Fleet will be put under the orders of the Commander-in-Chief of the Mediterranean Fleet twice a year, and under the orders

of the Commander-in-Chief of the Channel Fleet once a year, for combined exercises.

I hope to deal with the question of the allotment of battleships to the China station in my Memorandum on the Navy Estimates.

The cruisers working in extra-European waters will be divided into three groups. The Eastern group will comprise the cruisers of the China, Australia, and East Indies stations. The responsibility will rest on the Commander-in-Chief of the China station for the strategical distribution of those cruisers in time of war, so that they may at the earliest possible moment deal with all ships of the enemy to be found in those waters. The Cape of Good Hope Squadron will be a connecting link between either the Eastern group and the Mediterranean cruisers or the Eastern group and the Western group. The Western group of cruisers will consist of the cruisers under the command of the Commander-in-Chief of the North American and West Indian station and the mobilised cruisers with which he will be reinforced in time of war. At present the cruisers under the command of the Commander-in-Chief of the North American and West Indian station consist of his flag-ship, a first-class protected cruiser, and certain second and third class cruisers. The Board have decided to withdraw from the station the less effective of those ships, and to add to it the ships of the new Particular Service Squadron which they have decided to constitute, and of which the Commander-in-Chief of this station will be given the command.

Up to the present time the cadets from the Britannia in the second-class cruiser Isis and in the old armoured cruiser Aurora, the youths in the Northampton and her tenders, the Calliope and Cleopatra, and the boys in the Iris, Medea, and Medusa have all carried out their training afloat independently. It has been decided to transfer them all to valuable modern fighting ships, and to combine them into one squadron for training under the present Commander-in-Chief of the North American and West Indian station. They will make periodical returns to England, but the climate of the North American and West Indian station, extending as it does from the pole to the equator, will give the Admiral in command opportunities of organising their training under better climatic conditions than can be found anywhere else. The Particular Service Squadron will, therefore, consist of the Ariadne (flagship), St. George, Hawke, Gibraltar, Isis, Highflyer, and other vessels not yet appropriated. In time of war it will only be necessary to remove from those ships cadets or youths or boys still under training, and to complete the crews with the small additions required for war.

At present a ship is commissioned for three years, and this system prevails on all stations except those which are under the system known as home sea service. In the present Home Fleet, the present Channel Fleet, and the present Cruiser Squadron the ships are not commissioned for any definite period, but being within the category of home sea service are in a state of continuous commission, 25 per cent. of their crews being withdrawn every six months, and fresh entries from the depôts, generally the youngest and last entered seamen, taking their place. Even with ships in commission for three years the changes among the officers and men have been a constant and recognised evil, though owing to the expansion of the Fleet which has rendered it necessary to make constant calls on the ships afloat for ratings to be promoted or to attend the gunnery and torpedo schools, it has hitherto been an unavoidable one. It will, however, be readily believed that these changes have added greatly to the difficulties of the officers in keeping their ships efficient, especially in matters of gunnery. Greater still have been the difficulties which have confronted the officers of the present Home Fleet, Channel Fleet, and Cruiser Squadron where the systematic changes of 25 per cent. every six months have been additional to the constant changes due to the general causes mentioned above, and the excellent results nevertheless produced deserve public recognition. The Board have now decided to adopt a new system and to reduce the period of all commissions to two years. This system will be gradually applied to all vessels in commission, including the new Channel and Atlantic Fleets and the Cruiser Squadrons. When a ship has once been commissioned under this system no officer or man will be removed from her for any avoidable cause, and the only drafts which she will receive will be those required to make good unavoidable waste. At the same time the distinction between foreign sea service and home sea service will be abolished, and the only conditions of service which will be recognised are home service and sea service, *i.e.*, service in the Home ports or ashore and service afloat.

The following is the plan adopted for the reorganisation of the Fleet Reserve. The fighting ships will be organised quite separately from the obsolete or non-fighting ships. They will each have a captain, a second-in-command, and a proportion of the other officers, including engineer, gunnery, navigating, and torpedo officers. They will have a nucleus crew of two-fifths of their war complement, but in that two-fifths will be included all the more expert ratings, especially the torpedo ratings and the principal gun numbers, and each ship will periodically proceed to sea for the purpose of gunnery practice and of testing her machinery. They will be grouped homo-

geneously at the three Home ports according as their destination may be determined for reinforcement in time of war. Each group so formed will be commanded by a Flag Officer, who will himself take the reinforcements in time of war to the fleet which they are to reinforce, and he and he alone will be held responsible that every possible step has been taken to reduce breaks-down of machinery to a minimum, and that the fighting efficiency of his ships when mobilised is without flaw. In addition there will be a sufficient margin of ratings kept at home to enable the Board to commission an emergency squadron without dislocating the schools or nucleus crews or having recourse to a general mobilisation.

The manœuvres both in 1905 and 1906 will be directed to the testing of this scheme of reorganisation. In 1905 movements of the Fleet in commission and of a few mobilised ships will take place all over the world in view of hypothetical strained relations with an imaginary Power; in 1906 the supposition will be that war has actually broken out some weeks after the period of strained relations, and the Reserve Squadrons at the Home ports will be actually mobilised, and will proceed under their respective Rear-Admirals to reinforce the fleets to which they have been previously affiliated. The hostile fleets will be represented next year by various big cruisers (as a skeleton enemy), which will start on unknown dates from unknown places to represent the movements of the imaginary Power. The Commanders-in-Chief and other Flag Officers all over the world will have to act throughout on their own initiative; they will be responsible for keeping a continuous touch with the enemy and for continuous mutual co-operation; they will concert together beforehand their plans for mutual support, and the Port Admirals and other stationary officers must instantly comply with the requests of the Admirals at sea. In no case will references to the Admiralty be permitted.

It has been already stated that the cadets, youths, and boys under training are being transferred to modern fighting vessels. Similar action will be taken in the case of the more advanced training services where modern cruisers will be substituted for the older ones at present acting as schools for navigation or as tenders to the gunnery schools.

In order to provide the *personnel* for all these purposes a certain number of ships of comparatively small fighting value have been or will be withdrawn from commission, but care has been taken to leave enough ships on every station for the adequate performance of what I may call peace duties of Imperial Police, and the four Cruiser Squadrons will be employed to show the Flag in imposing force

wherever it may be deemed to be politically or strategically advisable.

In the reorganisation, a sketch of which I have given above, the Board have had but one object in view, and that is that on a declaration of war the fighting efficiency of the Fleet shall be complete and instantaneous. That the scheme will greatly increase the fighting efficiency of the Fleet there can, I think, be no doubt; it will also, I am happy to say, result in a very considerable economy on the Navy Estimates.

(Signed) SELBORNE.

December 6, 1904.

ARRANGEMENTS CONSEQUENT ON THE REDISTRIBUTION OF THE FLEET.

In continuation of my Memorandum of December 6, 1904 (Navy—Distribution and Mobilisation of the Fleet), I have now to announce that the changes there foreshadowed, so far as the lapse of time has permitted, have been made operative by orders recently issued.

2. These changes, which have been completed or are in course of completion, comprise:—

(i.) Increase of the Channel (late Home) Fleet to 12 battleships.

(ii.) Reconstitution of the late Channel Fleet as the Atlantic Fleet, with its permanent base at Gibraltar, under the command of a Commander-in-Chief.

(iii.) Constitution of the First Cruiser Squadron, affiliated to the Channel Fleet, and of the Second Cruiser Squadron, affiliated to the Atlantic Fleet, and each consisting of five armoured cruisers, to be increased in the near future to six armoured cruisers.

(iv.) The abolition of the South Atlantic Squadron.

(v.) The reconstitution of the Mediterranean Fleet with eight battleships, and the constitution of the armoured cruisers attached to the command as the Third Cruiser Squadron.

(vi.) Arrangements for the repairs of the Channel Fleet to be carried out at the Home dockyards, and those of the Atlantic and Mediterranean Fleets at Gibraltar and Malta respectively.

(vii.) The constitution of the Particular Service Squadron under the command of the Commander-in-Chief, North America and West Indies Station, composed of the Flag-ship on that station, and the five sea-going training ships for cadets, youths, and boys. This forms the Fourth Cruiser Squadron.

(viii.) The establishment of the system of commissioning all sea-going ships of the fighting line at the several Home ports with nucleus crews, with a Rear-Admiral in com-

mand at each port, so as to enable them to proceed to sea either singly or in squadrons at a few hours' notice.

N.B.—The squadron of nucleus crew ships at Devonport and Portsmouth have already completed their first cruise in the Channel with most satisfactory results.

(ix.) The substitution of modern cruisers for the older vessels recently acting as Schools for Navigation or as tenders to the Gunnery Schools.

(x.) The withdrawal from commission of vessels of comparatively small fighting efficiency.

3. Consequent on the above redistribution, further orders have been issued for regulating the cruises and manœuvres of the various fleets and squadrons.

4. These orders have been based on the principle, to which great importance is attached, that the fleets and squadrons everywhere should, as far as possible, be kept together as a whole, and ready at any time for instant action.

5. The advantages of such a system are manifest, but if carried out to the extent that a battleship or large cruiser, whether at anchor or under way, is never to be out of the sight, and, therefore, never out of the immediate control of a flag officer, there is danger of destroying the spirit of initiative and originality on the part of the individual captains.

6. It has, therefore, been laid down that at one period of the year, as may be convenient, the larger ships of each fleet may be separated for a few weeks by twos or threes in adjacent anchorages, where the respective captains may have the opportunity of carrying out independently any exercises they may desire to practice both at anchor and under way.

7. In pursuance of the general principle, orders have further been given that, as a rule, not more than one large vessel of a fleet or squadron is to be under repair in dockyard hands at one time, so as to ensure the various fleets and squadrons being kept always at their effective strength and ready for instant service. Each ship whilst undergoing her annual refit will take that opportunity of putting the crew through the annual musketry course and through such torpedo course in the way of practice and lectures, etc., as may be found desirable.

Gibraltar and the Limits of the Mediterranean Station.

8. Gibraltar having been constituted the permanent base of the Atlantic Fleet, involving the frequent presence there of the Com-

mander-in-Chief of that fleet, it was felt that to retain it as an integral part of the Mediterranean command would result in the establishment of a species of dual control over the *personnel* at Gibraltar, which could hardly fail to lead to complication and delay in the conduct of business at the port. It has therefore been judged expedient to separate it from the Mediterranean Station in peace time, and to place it under the immediate control of the Commander-in-Chief who will be generally present, and who will depend upon its dockyard for the repairs to its fleet. In war time it will revert to the Mediterranean Station.

9. The limits of the Mediterranean Station on the west, which at present extend into the Atlantic to the 10th degree of west longitude, have consequently been reduced, and the western boundary will henceforward be the 5th degree of west longitude, or about 16 miles to the east of Point Europa.

10. It is not proposed to give any geographical sphere to the Atlantic Fleet, which being permanently stationed in the vicinity of Gibraltar will naturally attend to any diplomatic or other work within reach of that place. Its cruising ground will extend into the western basin of the Mediterranean, inclusive of the west coast of Italy, the coast of Sicily and Cape Bon, and in the Atlantic it will extend to the north as far as Cape Finisterre, and to the west and south up to, and inclusive of, the Azores and the Canary Islands.

Cruises and Manœuvres of the Fleets and Squadrons.

11. The Atlantic Fleet will carry out combined manœuvres with the Mediterranean Fleet twice a year—at the end of April and at the beginning of August, and once a year with the Channel Fleet in February, and the period occupied in each of those meetings will not be less than seven nor more than fourteen days, exclusive of the days of meeting and parting.

12. Between the dates of these combined manœuvres the three above-mentioned fleets will carry out individual cruises and exercises, either in their own particular areas or in the adjacent waters, except in the months of June and July.

13. In the two last named months the general manœuvres referred to in my previous Memorandum will take place annually.

Cruiser Squadrons.

14. As already stated, the First and Second Cruiser Squadrons have been attached to the Channel and Atlantic Fleets, but they will

from time to time make independent cruises, with the object of showing the Flag at the principal ports on the coasts of the Atlantic Ocean. These cruises will, as a rule, each occupy about two months.

15. The Third Cruiser Squadron will remain in the Mediterranean under the orders of the Commander-in-Chief, and will be regarded and worked, so far as practicable, as a complete unit in conjunction with the destroyer flotilla which has been affiliated to it.

16. The Fourth Cruiser (Particular Service) Squadron, which comprises the flagship of the Vice-Admiral in command of the North America and West Indies Station, and the several sea-going training ships, will make three cruises annually in the West Indies and in Home and adjacent waters, returning home after each cruise at the dates fixed for changing the classes under training.

17. Under this arrangement it is estimated that the Fourth Cruiser Squadron will be cruising for thirty weeks, and will be at home for twenty-two weeks.

18. The refit and docking of the ships, and the leave to officers and men, will take place in the course of the time spent in Home waters.

19. The captains of the training ships will be allowed as much latitude as possible in the training, both at sea and in harbour. These ships will, so far as possible, act independently with regard to their drills, and competitive drills between them will be discountenanced as adverse to thorough and systematic instruction.

20. It is in contemplation at an early date to combine the four Cruiser Squadrons for special cruiser exercises.

Eastern Fleet.

21. The Commander-in-Chief in China has been instructed in the sense of paragraphs 4 to 7 inclusive, and directed to furnish a programme each year of the cruises and exercises he proposes to carry out.

After the conclusion of the manœuvres in the summer, the China, East Indies, and Australian Squadrons, which will then be at their war stations, will rendezvous at Singapore for combined fleet exercise. An opportunity will thus be afforded for that interchange of views between the Admirals which the Board of Admiralty deem so important.

Special Vessels.

22. The new fast cruiser Diamond will be stationed at Bermuda for service in the West Indies, to protect British interests during

the time when the Fourth Cruiser Squadron is absent from those waters.

23. The Shearwater will be stationed at Esquimalt for any services that may be required on the Pacific Coast, but more especially for duties in connection with the Behring Sea Fisheries.

24. The Dwarf is stationed on the West Coast of Africa for any services that may be required there.

25. The Assistance, repair ship vessel of over 10,000 tons, very elaborately fitted for the purpose, has now been attached to the Atlantic Fleet.

General Organisation of Torpedo Flotillas.

26. The question of extending the existing organisation of the torpedo craft at home and abroad has been carefully reconsidered with a view to obtaining the maximum advantage possible from the newly-introduced nucleus crew system, the establishment of which has enabled a great advance to be made in the number of torpedo craft which can be maintained continually ready for instant action on a sudden emergency. Every effective torpedo vessel in reserve of every type and class is now, and will be henceforth, in commission in reserve with a crew of two-fifths full strength, and the men who are available in the depôts for the purpose can *at once* complete full crews required; it is therefore clear that, whereas the old organisation provided a certain number of vessels instantly ready, the new organisation provides that number, plus the whole of the remaining effective vessels, ready to complete for commission at sea on the simple receipt of a telegram or signal, as the balance of their crews are available at the ports.

27. Periodically the torpedo craft in reserve with nucleus crews will conduct tactical exercises under way, and such short cruises and instructional evolutions as may be found to be desirable.

28. The essence of the employment of torpedo craft is immediate readiness for all eventualities, and many important advantages may be looked for from a system which employs a specially selected and trained *personnel* for long periods in torpedo craft.

Torpedo Craft Flotilla in Home Waters.

29. A Rear-Admiral has been appointed to command all destroyers, torpedo boats, and submarines in full commission, and also those in commission in reserve in Home waters. He will fly his flag in the new fast cruiser Sapphire, with headquarters at Portland.

30. The torpedo boats and submarines at the Home ports, so long as they are based on those ports, will, however, remain under the supreme control of the respective Commanders-in-Chief, as at present.

31. The stationary destroyer depôt ships Erebus, Fisgard, and Tenedos, having been appropriated for the purpose of training boy artificers, their place has been taken by the old first-class cruiser Impérieuse, which will be stationed at Portland as tender to the Sapphire, and will be known as Sapphire II.

32. Pending the completion of the destroyer base at Sheerness, and of the harbour works at Dover, the twenty-four destroyers in the three sea-going flotillas have been concentrated at Portland as tenders to the flagship Sapphire.

Torpedo Craft Flotilla Attached to the Atlantic Fleet.

33. H.M. ships Leander and Tyne will be placed under the orders of the Commander-in-Chief of the Atlantic Fleet as depôt ships for the destroyer and torpedo boat flotillas attached to his fleet, which will comprise the following:—

10 destroyers in commission with full crews.

8 destroyers	In reserve at Gibraltar. Commissioned with nucleus crews.
12 first-class torpedo boats	

Torpedo Craft Flotilla in the Mediterranean.

34. The Rear-Admiral commanding the Third Cruiser Squadron will be immediately responsible to the Commander-in-Chief for this flotilla equally with the Squadron. H.M.S. Vulcan will act as depôt ship for the flotillas. The number of torpedo craft attached to the Mediterranean Fleet will be as follows:—

15 destroyers in commission with full crews.

7 destroyers	In reserve at Malta. Commissioned with nucleus crews.
9 first-class torpedo boats.	

Torpedo Craft Flotilla on the China Station.

35. The Hecla will shortly proceed to China as a depôt ship for the torpedo craft on the station, which will comprise the following:—

6 destroyers in commission with full crews.

2 destroyers	In reserve at Hong Kong. Commissioned with nucleus crews.
4 first-class torpedo boats.	

36. The Board are well aware that these changes have sometimes entailed considerable inconvenience on those concerned in them, but they were necessary for the good of the Service, and the Board are glad to take this opportunity of expressing their cordial appreciation of the thoroughly efficient and loyal manner in which they have been carried out by all ranks and ratings of His Majesty's Navy.

SELBORNE.

March 15, 1905.

Abstract of Navy Estimates for 1905-1906.

Votes.		Estimates, 1905-1906.			Estimates, 1904-1905.			Difference on Net Estimates.		Votes.
		Gross Estimate.	Appropriations in Aid.	Net Estimate.	Gross Estimate.	Appropriations in Aid.	Net Estimate.	Increase.	Decrease.	
	I.—NUMBERS.			Total Numbers.			Total Numbers.	Numbers.	Numbers.	
A.	Total Number of Officers, Seamen, Boys, Coast Guard, and Royal Marines	129,000	....	129,000	131,100	....	131,100	....	2,100	A.
	II.—EFFECTIVE SERVICES.	£	£	£	£	£	£	£	£	
1	Wages, &c., of Officers, Seamen and Boys, Coast Guard, and Royal Marines	6,807,500	135,500	6,672,000	6,825,143	134,143	6,691,000	....	19,000	1
2	Victualling and Clothing for the Navy	2,836,851	580,251	2,256,600	2,952,085	524,085	2,428,000	....	171,400	2
3	Medical Establishments and Services	298,371	20,871	277,500	314,970	21,970	293,000	....	15,500	3
4	Martial Law	14,132	132	14,000	15,626	126	15,500	....	1,500	4
5	Educational Services	219,252	57,352	161,900	199,340	45,340	154,000	7,900	....	5
6	Scientific Services	89,397	20,097	69,300	92,722	20,122	72,600	....	3,300	6
7	Royal Naval Reserves	428,729	8,129	420,600	412,679	8,179	404,500	16,100	....	7
8	Shipbuilding, Repairs, Maintenance, &c.:									8
	Section I.—*Personnel*	2,790,100	21,800	2,768,300	3,065,800	21,600	3,044,200	....	275,900	Sec. I.
	Section II.—*Matériel*	5,344,900	528,000	4,816,900	5,419,900	357,100	5,062,800	....	245,900	Sec. II.
	Section III.—Contract Work	7,959,800	132,000	7,827,800	10,446,000	132,000	10,314,000	....	2,486,200	Sec. III.
9	Naval Armaments	3,083,557	97,557	2,986,000	3,734,000	88,000	3,646,000	....	660,000	9
10	Works, Buildings, and Repairs at Home and Abroad	1,935,200	30,000	1,905,200	1,663,200	29,000	1,634,200	271,000	....	10
11	Miscellaneous Effective Services	469,095	15,095	454,000	458,538	14,538	444,000	10,000	....	11
12	Admiralty Office	345,250	8,850	336,400	336,400	9,000	327,400	9,000	....	12
	Total Effective Services . £	32,622,134	1,655,634	30,966,500	35,936,403	1,405,203	34,531,200	314,000	3,878,700	
	III.—NON-EFFECTIVE SERVICES.									
13	Half-Pay, Reserved, and Retired Pay	813,744	12,844	800,900	809,086	12,886	796,200	4,700	....	13
14	Naval and Marine Pensions, Gratuities, and Compassionate Allowances	1,253,661	19,761	1,233,900	1,228,601	19,801	1,208,800	25,100	....	14
15	Civil Pensions and Gratuities	388,648	448	388,200	353,748	448	353,300	34,900	....	15
	Total Non-Effective Services . £	2,456,053	33,053	2,423,000	2,391,435	33,135	2,358,300	64,700	....	
	GRAND TOTAL . £	35,078,187	1,688,687	33,389,500	38,327,838	1,438,338	36,889,500	378,700	3,878,700	

Net Decrease £3,500,000

STATEMENT of the Principal Points of DIFFERENCE between the ESTIMATES of 1904–1905 and those for 1905–1906.

DECREASES.		£
Wages, &c., of Officers, Seamen, and Marines		19,000
Victualling and Clothing		171,400
Medical Establishments and Services		15,500
Martial Law		1,500
Scientific Services		3,300
Wages of Artificers and Police in Dockyards		273,100
Naval Stores		50,900
Propelling Machinery for His Majesty's Ships and Vessels (Contract)		797,245
Hulls of Ships (Contract)		1,670,924
Repairs and Alterations by Contract of Ships, &c.		305,000
Inspection of Contract Work		7,516
Guns		229,000
Projectiles and Ammunition		375,000
Small Arms, Maintenance of Naval Ordnance Vessels, &c.		71,500
Inspection, Proof, Experiments, &c. (Naval Ordnance Stores)		10,000
Increase in amount of Receipts arising from the Sale of Old Ships and unserviceable Naval Stores and Naval Ordnance Stores		204,170
Miscellaneous Decreases		4,630
		£4,209,685
INCREASES.	£	
Educational Services	7,900	
Royal Naval Reserves	16,100	
Auxiliary Machinery for His Majesty's Ships and Vessels (Contract)	75,468	
Gun Mountings (Contract)	150,317	
Royal Reserve of Merchant Cruisers	68,700	
Torpedoes and Gun-cotton	45,500	
Works, Buildings, and Repairs	271,000	
Miscellaneous Effective Services	10,000	
Non-Effective Services	64,700	
		709,685
Net Decrease		£3,500,000

STATEMENT showing the Total Estimated EXPENDITURE for the NAVAL SERVICE, including Amounts provided in the NAVY ESTIMATES, as well as in the CIVIL SERVICE and other ESTIMATES, for the following Services:—

——		1905–1906.	1904–1905.
NAVY ESTIMATES:		£	£
Estimated Expenditure (after deducting Appropriations in Aid) . .		33,389,500	36,889,500
CIVIL SERVICE ESTIMATES: (a)			
Estimated Expenditure under—			
Class I. Vote 9.—Public Buildings, Great Britain:	£		
Maintenance and Repairs, including New Works, Alterations, &c. .	16,920		
Rents, Insurance, Tithes, &c. . .	13,130		
Fuel, Light, Water, &c. . . .	5,000		
Furniture	6,000		
		41,050	31,750
Class I. Vote 10.—Surveys of the United Kingdom		900	200
" I. " 13.—Rates on Government Property		117,200	115,300
" I. " 14.—Public Works and Buildings, Ireland:			
Coast Guard, viz.:	£		
Purchase of Sites . . .	—		
New Works and Alterations, including Naval Reserve Stations . .	18,967		
Maintenance and Supplies . .	5,886		
	£24,853		
Naval Reserve, viz.:			
Maintenance and Supplies . .	200		
		25,053	17,631
Class II. Vote 8.—Board of Trade:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force . . .		4,105	3,737
" II. " 9.—Mercantile Marine Services:			
Staff and Incidental Expenses in connection with the Royal Naval Reserve Force . . .		4,000	4,000
" II. " 14.—Exchequer and Audit Department (Cost of Audit):	£		
Navy Cash Accounts . . .	8,600		
Expense and Manufacturing Accounts	4,600		
Store Accounts	5,300		
		18,500	19,000
Class II. Vote 23.—Stationery and Printing		100,000	91,000
" III. " 1.—Law Charges, England		7,413	6,388
Maintenance of Naval Prisoners:			
" III. " 7.—Prisons, England and the Colonies . . .		4,522	4,831
" III. " 13.—Prisons, Scotland		140	120
" III. " 20.—Prisons, Ireland		310	392
REVENUE DEPARTMENT ESTIMATES:			
Vote 1.—Customs.—Percentage for provision of funds for District Paymasters of the Coast Guard		137	126
Vote 1.—Customs.—Staff and Incidental Expenses in connection with the Royal Naval Reserve Force		3,300	3,300
Vote 2.—Inland Revenue.—Analysis of Food, &c.		340	165
Vote 3.—Post Office.—Postage of Official Correspondence (including Parcels)	£ 17,000		
Vote 5.—Post Office Telegraphs.—Official Telegrams and Expenses in connection with Telegraphs (Admiralty Wires, and Services of Clerks)	20,210		
		37,210	37,070
Total . . . . £		33,753,680	37,224,510

Note.—In addition to the Services shown above, an annuity of £16,243 18*s.* is payable to the Commissioners of Woods, &c., from the Consolidated Fund, under the Public Offices Sites Act of 1882 (45 & 46 Vict. c. 32).

(*a*) Provision is also made in the Estimate for Osborne (Class I., Vote 2.) for expenditure in connection with the treatment of invalid Officers of the Navy in the Convalescent Home at Osborne.

STATEMENT showing the CONTRIBUTIONS from INDIA and the COLONIES towards NAVAL EXPENDITURE.

RECEIVED FROM.	NATURE OF SERVICE.	VOTE.														TOTAL.
		1	2	3	7	8			9	11	12	13	14	15	
						Section I.	Section II.	Section III.							
		£	£	£	£	£	£	£	£	£	£	£	£	£	£
India	Maintenance of His Majesty's Ships in Indian Waters . .	28,000	9,100	500	..	12,500	10,200	13,000	11,600	2,500	..	4,300	8,300	..	100,000
	Indian Troop Service (on account of work performed by the Admiralty) . . .	..	..	..	..	..	..	..	..	..	3,050	..	..	350	3,400
Australian Commonwealth New Zealand .	Maintenance of an Australasian Squadron and the establishment of a branch of the Royal Naval Reserve	58,000	18,300	600	5,000	..	30,700	95,000	5,500	7,000	..	8,500	11,400	..	200,000 40,000
Cape Colony . .	General maintenance of the Navy . .	11,100	4,600	..	..	4,900	9,100	14,100	6,200	..	..	..	..	..	50,000
Natal		7,700	3,200	..	..	3,400	6,400	9,900	4,400	..	..	..	..	..	35,000
Newfoundland .	Maintenance of a branch of the Royal Naval Reserve . .	..	..	..	3,000	..	..	..	..	..	..	..	..	..	3,000
	Total . . £	104,800	35,200	1,100	8,000	20,800	56,400	132,000	27,700	9,500	3,050	12,800	19,700	350	431,400

VOTE (A).

NUMBERS of Officers, Seamen, Boys, and Royal Marines Borne on the Books of His Majesty's Ships, and at the Royal Marine Divisions.

One Hundred and Twenty-nine Thousand.

I.—Sea Service.

Under which Vote Provided.	RANKS, &c.	NUMBERS, ALL RANKS. 1905–1906.		1904–1905.		Numbers of all Ranks borne on 1st January, 1905.
	For His Majesty's Fleet:					
	Flag Officers	25		20		
	Commissioned Officers . .	4,430		4,342		
	Subordinate Officers . . .	812		812		
	Warrant Officers . . .	1,797		1,730		
	Petty Officers and Seamen . .	87,007		86,680		
	Boys (Service)	2,700	96,771	3,400	96,984	98,720
	Coast Guard:					
	Commissioned Officers . .	103		95		
Vote 1	Chief Officers Divisions and Stations	247		244		
	Petty Officers and Seamen . .	4,019	4,369	3,964	4,303	4,135
	Royal Marines (for Service Afloat and on Shore):					
	Commissioned Officers . .	467		468		
	Warrant Officers . . .	44		37		
	Staff Sergeants and Sergeants .	1,415		1,459		
	Buglers and Musicians . .	646		995		
	Rank and File	17,062		17,019		
	Band Boys	349	(a) 19,983	400	20,378	20,186
	Total . . .		121,123		121,665	123,041

Net Decrease. . . . 542

(a) Including 13 officers.

VOTE (A)—*continued.*

II.—OTHER SERVICES.

Under which Vote Provided.	RANKS, &c.	NUMBERS, ALL RANKS. 1905–1906.		1904–1905.		Numbers of all Ranks borne on 1st January 1905.
Vote 1	Naval Cadets	640		585		
	Engineer Cadets	138		149		
	Pensioners in Home Ships and in the Reserves, &c.	968		932		
	Boys under Training—					
	Seaman Class	3,600		5,000		
	Artificer	460	(b) 5,806	360	7,026	6,051
Vote 2	For Victualling and Clothing for the Navy	58		57		
Vote 3	For Medical Establishments and Services	581		601		
Vote 4	For Martial Law	12		24		
Vote 5	For Educational Services	463		460		
Vote 6	For Scientific Services	11		8		
Vote 8	For Shipbuilding, Repairs, Maintenance, &c.:					
	Section I.	574		748		
	Section II.	8		28		
	Section III.	69		66		
Vote 9	For Naval Armaments	173		253		
Vote 10	For Works, Buildings, and Repairs, at Home and Abroad	52		105		
Vote 11	For Miscellaneous Effective Services	1		1		
Vote 12	For Admiralty Office	66	2,071	58	2,409	2,406
	Total		(c) 7,877		9,435	8,457
	Net Decrease		1,558			
	Total, Sea Service	121,123		121,665		
	" other Services	7,877	129,000	9,435	131,100	
	Net Decrease		2,100			

(b) Including 11 officers.

(c) Including			
Officers and Seamen	2,149	..	2,302
" Pensioners (Vote 1)	957	..	921
" Pensioners (other Votes)	27	..	18
" Boys (Training, Seaman Class)	3,600	..	5,000
" Boys (Training, Artificer)	460	..	360
" Boys (Training, Artizan)	456	..	556
" Royal Marines	228	..	278
	7,877	..	9,435

VOTE 8.

SHIPBUILDING, REPAIRS, MAINTENANCE, &c.

I.—ESTIMATE of the SUM which will be required, in the YEAR ending 31st March, 1906, to defray the EXPENSES of SHIPBUILDING, REPAIRS, MAINTENANCE, &c., including the COST of ESTABLISHMENTS of DOCKYARDS and NAVAL YARDS at HOME and ABROAD.

DOCKYARD WORK.

SECTION I.—PERSONNEL.—Two Million Seven Hundred and Sixty-eight Thousand Three Hundred Pounds.
(£2,768,300.)

SECTION II.—MATÉRIEL.—Four Million Eight Hundred and Sixteen Thousand Nine Hundred Pounds.
(£4,816,900.)

CONTRACT WORK.

SECTION III.—CONTRACT WORK.—Seven Million Eight Hundred and Twenty-seven Thousand Eight Hundred Pounds.
(£7,827,800.)

II.—SUB-HEADS under which SECTION I., PERSONNEL, of this VOTE will be accounted for.

	ESTIMATES.		Increase.	Decrease.
	1905–1906.	1904–1905.		
	£	£	£	£
DOCKYARD WORK.				
SECTION I.—PERSONNEL.				
Dockyards at Home.				
A.—Salaries and Allowances . . .	(a) 212,183	208,506	3,677	..
B.—Wages, &c., of Men, and hire of Teams	2,125,868	2,328,432	..	202,564
C.—Wages, &c., of Police Force . .	46,595	46,250	345	..
D.—Contingencies	2,400	2,200	200	..
Naval Yards Abroad.				
E.—Salaries and Allowances . . .	(a) 96,790	103,098	..	6,308
F.—Wages, &c., of Men, and hire of Teams	288,399	357,609	..	69,210
G.—Wages, &c., of Police Force . .	17,265	18,905	..	1,640
H.—Contingencies	600	800	..	200
£	2,790,100	3,065,800	4,222	279,922
Deduct,—				
I.—Appropriations in Aid . . .	21,800	21,600	200	..
£	2,768,300	3,044,200	4,022	279,922
		Net Decrease	. £275,900	

(a) These amounts include the sums of £34,332 and £14,226 for pay of Inspectors of Trades at Home and Abroad respectively, which is charged direct to the cost of shipbuilding.

Note.—Provision has been made for New Construction in the above Vote to the extent of—

	£
Section 1	791,250
" 2	1,737,590
" 3	7,037,162
	£9,566,002

The details of the total anticipated Expenditure on New Construction will be found on page 480.

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION II., MATÉRIEL, of this VOTE will be accounted for.

——	ESTIMATES.		Increase.	Decrease.
	1905–1906.	1904–1905.		
	£	£	£	£
DOCKYARD WORK—*continued.*				
SECTION II.—MATÉRIEL.				
Naval Stores, &c.				
A.—Timber, Masts, Deals, &c.	171,500	158,000	13,500	..
B.—Metals and Metal Articles	2,047,000	1,749,500	297,500	..
C.—Coal for Yard purposes	83,500	101,000	..	17,500
D.—Hemp, Canvas, &c.	173,300	250,500	..	77,200
E.—Paint Materials, Oils, Pitch, Tar, Tallow, Boats, Furniture, and other Miscellaneous Articles	613,500	789,500	..	176,000
F.—Electrical, Torpedo, and other Apparatus	373,500	394,700	..	21,200
G.—Freight	68,000	75,000	..	7,000
H.—Rents, Water, &c., Dockyards at Home, and Naval Yards Abroad	40,800	43,400	..	2,600
I.—Gas, Electric Light, &c., Dockyards at Home and Naval Yards Abroad.	19,800	19,300	500	..
£	3,590,900	3,580,900	311,500	301,500
Deduct—				
J.—Appropriations in Aid.	508,000	327,100	180,900	..
£	3,082,900	3,253,800	130,600	301,500
Coal for the Fleet.				
K. I.—Coal, &c., for the Fleet	1,497,000	1,606,500	..	109,500
K. II.—New Craft and machinery for Coaling, &c.	80,000	72,500	7,500	..
K. III.—Wages of crews and coaling labour	113,000	95,500	17,500	..
K. IV.—Maintenance of Craft for coaling, &c., and incidental expenses	64,000	64,500	..	500
£	1,754,000	1,839,000	25,000	110,000
Deduct—				
L.—Appropriations in Aid	20,000	30,000	..	10,000
£	1,734,000	1,809,000	25,000	100,000
£	4,816,900	5,062,800	155,600	401,500
	Net Decrease		£245,900	

VOTE 8.—SHIPBUILDING, REPAIRS, MAINTENANCE, &c.—*continued.*

II.—SUB-HEADS under which SECTION III., CONTRACT WORK, of this VOTE will be accounted for.

	ESTIMATES.		Increase.	Decrease.
	1905-1906.	1904-1905.		
	£	£	£	£
SECTION III.—CONTRACT WORK.				
A.—Propelling Machinery for His Majesty's Ships and Vessels . .	2,772,669	3,569,914	..	797,245
B.—Auxiliary Machinery for His Majesty's Ships and Vessels . .	169,203	93,735	75,468	..
C.—Hulls of Ships, &c., Building by Contract	2,622,923	4,293,847	..	1,670,924
D.—Purchase of Ships, Vessels, &c. .	..	..	..	..
E.—Repairs and Alterations by Contract of Ships, &c., and their Machinery and Stores	108,000	413,000	..	305,000
F.—Inspection of Contract Work . .	62,484	70,000	..	7,516
G.—Gun Mountings and Air-Compressing Machinery	1,782,021	1,631,704	150,317	..
H.—Machinery for His Majesty's Shore Establishments at Home and Abroad	200,000	200,000	..	..
H.H.—Replacement of Machinery for His Majesty's Shore Establishments .	100,000	100,000	..	..
I.—Royal Reserve of Merchant Cruisers.	142,500	73,800	68,700	..
£	7,959,800	10,446,000	294,485	2,780,685
Deduct—				
K.—Appropriations in Aid . . .	132,000	132,000	..	..
£	7,827,800	10,314,000	294,485	2,780,685
	Net Decrease .		. £2,486,200	

PROGRAMME of the ESTIMATED EXPENDITURE in CASH, and in NET
REPAIRS, MAINTENANCE, &c.,
(Exclusive of the FLEET

SUB-HEADS under which this ESTIMATED EXPENDITURE will be
provisions of Section 1 (2), ARMY

	ESTIMATED EXPENDITURE IN				
	Direct Expenditure.				
	Dockyard Work.		Contract Work, Sec. III.	Total Direct Expenditure. (A)	
	Personnel, Sec. I.	Matériel, Sec. II.			
	£	£	£	£	
NEW CONSTRUCTION:					
A.—DOCKYARD-BUILT SHIPS—					
Hulls, &c. (c)	746,590	(f) 1,677,990	810,689	3,235,269	1
Machinery	18,430	10,250	884,890	913,570	2
	765,020	1,688,240	1,695,579	4,148,839	3
B.—CONTRACT-BUILT SHIPS—					
Hulls, &c. (c)	25,080	47,650	(g) 3,320,167	3,392,897	4
Machinery	..	..	1,863,689	1,863,689	5
	25,080	47,650	5,183,856	5,256,586	6
C.—SMALL VESSELS (d)	1,150	1,700	42,984	45,834	7
TOTAL NEW CONSTRUCTION	791,250	1,737,590	6,922,419	(e) 9,451,259	8
D.—RE-CONSTRUCTION, REPAIRS, ALTERATIONS, &c.	1,038,210	611,580	373,725	2,023,515	9
E.—SEA STORES, &c.	..	912,930	14,587	927,517	10
F.—ESTABLISHMENT, INCIDENTAL, AND MISCELLANEOUS CHARGES, UNAPPROPRIATED	..	..	..	..	11
TOTAL £	1,829,460	3,262,100	7,310,731	12,402,291	12

(c) Including Hydraulic and Transferable Gun Mountings, &c.
(d) Including Harbour Craft, and excluding Torpedo Boats, &c., the value of which is included under other Sub-Heads.
(e) Exclusive of £13,000 provided under Vote 2 for new Tank Vessels and Lighters for Victualling Yard Service; also £1,970 provided under Vote 9 for new Vessels for Naval Ordnance Store Service, and £67,500 for Coaling Craft.
(f) Including £1,260,000 for Armour.
(g) Including £475,693 for Armour.

VALUES OF STORES issued for SHIPBUILDING, RE-CONSTRUCTION, in the Year 1905–1906.
COALING SERVICE.)
accounted for in the NAVY EXPENSE ACCOUNTS, under the AND NAVY AUDIT ACT, 1889.

	1905–1906.		EXPENDITURE AS ESTIMATED IN NAVY ESTIMATES, 1904–1905.			Difference between Direct Expenditure, 1904–1905 (B) and 1905–1906 (A).	
	Establishment, &c., Charges, apportioned.	Aggregate, 1905–1906.	Direct Expenditure. (B)	Establishment, &c., Charges, apportioned.	Aggregate, 1904–1905.	Increase.	Decrease.
	£	£	£	£	£	£	£
1	348,135	3,583,404	(h) 2,816,665	302,854	3,119,519	418,604	..
2	22,670	936,240	864,107	20,560	884,667	49,463	..
3	**370,805**	**4,519,644**	**3,680,772**	**323,414**	**4,004,186**	**468,067**	..
4	71,378	3,464,275	(i) 5,321,328	83,978	5,405,306	..	1,928,431
5	33,640	1,897,329	2,625,456	35,872	2,661,328	..	761,767
6	**105,018**	**5,361,604**	**7,946,784**	**119,850**	**8,066,634**	..	**2,690,198**
7	1,082	46,916	26,620	652	27,272	19,214	..
8	**476,905**	**9,928,164**	**11,654,176**	**443,916**	**12,098,092**	..	**2,202,917**
9	303,607	2,327,122	2,564,815	321,474	2,886,319	..	541,330
10	62,915	990,432	1,036,820	65,730	1,102,550	..	109,303
	843,427			831,120			
11	1,752,193	1,752,193	..	1,731,246	1,731,246	..	..
12	**2,595,620**	**14,997,911**	**15,255,841**	**2,562,366**	**17,818,207**	..	..

NET DECREASE ON DIRECT EXPENDITURE . . £2,853,550

(h) Including £906,051 for Armour.
(i) Including £741,455 for Armour.

RECAPITULATION OF ESTIMATED EXPENDITURE.

SUB-HEADS OF EXPENDITURE.			A., B., and C.	D.			E.	F.		
DOCKYARD WORK—	£	£	£	£	£	£	£	£	£	£
Section I.—*Personnel* . .	1,829,460	1,181,712	997,537	—	433,504	753,135	37,521	503,154	306,321	3,011,172
Section II.—*Matériel* . .	3,262,100	841,429	1,903,255	—	232,246	529,486	938,324	321,460	345,568	4,103,529
CONTRACT WORK—										
Section III.	7,310,731	572,479	7,047,372	—	49,018	329,733	14,587	264,790	10,900	7,883,210
Total Estimated Expenditure for 1905–1906	12,402,291	2,595,620	9,928,164	—	714,768	1,612,354	990,432	1,089,404	662,789	14,997,911
Totals of Sub-Heads £	**14,997,911**		**9,928,164**	**2,327,122**			**990,432**	**1,752,193**		**14,997,911**

DIAGRAM SHEWING THE EXPENDITURE UPON THE CONSTRUCTION OF NEW SHIPS, DURING THE 33 YEARS BETWEEN 1873-74 & 1905-6

EXPENDITURE £

1873-4, 1874-5, 1875-6, 1876-7, 1877-8, 1878-9, 1879-80, 1880-1, 1881-2, 1882-3, 1883-4, 1884-5, 1885-6, 1886-7, 1887-8, 1888-9, 1889-90, 1890-1, 1891-2, 1892-3, 1893-4, 1894-5, 1895-6, 1896-7, 1897-8, 1898-9, 1899-0, 1900-1, 1901-2, 1902-3, 1903-4, 1904-5, 1905-6

12,000,000 8 6 4 2 11,000,000 8 6 4 2 10,000,000 8 6 4 2 9,000,000 8 6 4 2 8,000,000 8 6 4 2 7,000,000 8 6 4 2 6,000,000 8 6 4 2 5,000,000 8 6 4 2 4,000,000 8 6 4 2 3,000,000 8 6 4 2 2,000,000 8 6 4 2 1,000,000 8 6 4 2

EXPENDITURE £

WM. CLOWES AND SONS, LTD., LONDON.

LIST of NEW SHIPS and VESSELS Estimated to be Passed into the RESERVE FLEET during the Years 1905–1906 and 1904–1905.

1905–1906.				1904–1905.			
NAME OF SHIP.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.	NAME OF SHIP.	Load Displacement in Tons.	Indicated Horse Power.	Number of Guns.
ARMOURED SHIPS.				**ARMOURED SHIPS.**			
New Zealand . .	16,350	*18,000	18	King Edward VII .	16,350	*18,000	18
Dominion . . .	16,350	18,000	18	Commonwealth . .	16,350	18,000	18
Hindustan . . .	16,350	*18,000	18	Swiftsure . . .	11,800	*12,500	18
Duke of Edinburgh .	13,550	*23,500	16	Triumph. . . .	11,985	*12,500	18
Black Prince . . .	13,550	*23,500	16	Cornwall. . . .	9,800	22,000	14
Devonshire . . .	10,850	*21,000	10				
Antrim	10,850	*21,000	10				
Argyll.	10,850	*21,000	10				
Carnarvon . . .	10,850	*21,000	10				
Hampshire . . .	10,850	*21,000	10				
Roxburgh	10,850	*21,000	10				
PROTECTED SHIPS.				**PROTECTED SHIPS.**			
Encounter . . .	5,880	12,500	11	Challenger . . .	5,880	12,500	11
				Topaze	3,000	*9,800	12
				Diamond. . . .	3,000	*9,800	12
				Sapphire . . .	3,000	*9,800	12
				Amethyst . . .	3,000	†	12
UNPROTECTED SHIPS.				**UNPROTECTED SHIPS.**			
				Enchantress . .	3,190	*6,000	..
				Sealark	900	500	..
				Argus	380	*650	..
				Squirrel	230	300	..
				Widgeon. . . .	195	*800	..
TORPEDO BOAT DESTROYERS 16	various			TORPEDO BOAT DESTROYERS . 9	various		..
TORPEDO BOATS . nil	..	..	..	TORPEDO BOATS . 4	..	..	..
SUBMARINE BOATS 10	..	..	..	SUBMARINE BOATS 12	..	..	..

* Forced draught. † Turbine engines.

Austro-Hungarian Navy Estimates, 1905.

(Converted at 8s. 4d. = 10 Kronen.

The Ordinary Estimates for 1905 show an increase of £142,916, and the Extraordinary Estimates an increase of £101,250, over 1904. In addition, an Extraordinary Credit of £3,132,333, in respect of 1904 and 1905, has been granted, of which £919,959 is to be claimed and used as a refund.

Ordinary Estimates.

	£
Pay of officers, etc.	179,938
Pay of petty officers and seamen, with clothing	159,372
Land service	78,271
Sea	205,580
Establishments :—	
Hydrographical Office and Naval Library	3,297
Naval Academy	9,440
,, lower-grade schools	241
,, hospitals	10,042
Maintenance of the Fleet :—	
Dockyards, repairs, and *matériel*	310,930
New Ships and Machinery :—	
Ram-cruiser St. Georg, 7300 tons, sixth and final instalment of total vote of £441,044	48,583
Battleship Erzherzog Karl, 10,600 tons, fifth instalment of total vote of £725,000	175,000
Battleship Erzherzog Friedrich, 10,600 tons, fourth instalment of total vote of £725,000	179,167
Battleship C, 10,600 tons, second instalment of total vote of £725,000	145,833
Torpedo-boats, to replace second and third class torpedo boats, first instalment of total vote of about £333,333	85,542
Ordnance, etc.	60,000
Miscellaneous expenses	154,198
	1,796,434
Less sundry deductions	10,208
Total Ordinary Estimates	1,786,226

Extraordinary Estimates.

	£
Sundry expenses in connection with Naval Academy, ships' libraries, charts, printing, etc.	1,774
Maintenance of the Fleet—New Ships and Machinery:—	
Steel floating dock, fourth instalment of total vote of £187,500	1,042
Two river gunboats, Temes and Bodrog, and five patrol boats, fourth instalment of total vote of £141,666	31,250
Ordnance—Guns, gun-mountings, ammunition, torpedoes, submarine mines, etc.:—	
Armament of ram-cruiser St. Georg, fifth instalment of £114,583	29,166
Armament of battleship Erzherzog Karl, third instalment of £211,250	66,666
Armament of battleship, Erzherzog Friedrich, second instalment of £211,250	41,666
Armament of two river gunboats, Temes and Bodrog, and five patrol boats, second instalment of £21,667	2,500
Armament for battleship C, first instalment of £211,250	20,834
8-mm. machine guns and small arms	3,499
Ammunition, etc., for Babenberg, St. Georg, Erzherzog Karl	70,838
Ammunition for 15-cm. Q.F. guns	2,083
Ammunition for Erzherzog Friedrich	12,500
Ammunition for Temes and Bodrog, and five patrol boats	8,333
Torpedoes and torpedo-nets	7,500
Wireless telegraphic apparatus	2,500
Workshops, buildings, and other works	24,416
Expenses *re* Embassy Guard at Pekin	11,611
Printing and Miscellaneous	1,666
Total Extraordinary Estimates	339,874

Extraordinary Credit for 1904 and 1905.

	1904.	1905.
Fuel and Stores	41,666	125,000
New Ships and Machinery	137,500	848,584
Torpedo Flotilla	83,333	637,500
Submarines	—	125,000
Reserve of Guns	31,250	31,250
River Gunboats and Patrol boats	12,500	50,000
Armaments	22,917	273,333
Ammunition	108,332	229,167
Ammunition, supplementary, and torpedoes	41,666	208,333
Works at Pola	41,666	83,333
	£520,830	£2,611,500

French Navy Estimates, 1905.

Cap. in Estimates. 1905.	Heads of Expenditure.	Credits voted for 1905.	Credits voted for 1904.
		£	£
	PERSONNEL.		
1, 2	Admiralty Office	140,802	140,778
5, 6, 7	Navy Pay	2,017,565	1,970,162
8	Inspection of Administrative Services	12,967	12,967
9, 10	Construction and Ordnance Staff	281,548	282,318
11, 12, 14, 15	Administrative Staff, Commissariat, and Inscription Maritime	286,418	286,631
13	Medical and Religious Staff	73,013	73,013
55	Fisheries and Navigation	28,052	28,052
	LABOUR.		
	Wages—		
27	Shipbuilding; new construction; fitting for sea	491,480	481,362
29	Shipbuilding; repairs	213,816	200,674
24, 31	Master-attendants' and Storekeepers' Departments	269,965	246,373
35	Armaments; construction of new guns	102,865	100,966
37, 39	Armaments; repairs	99,762	97,600
41	Torpedoes, etc.	27,458	27,091
45	Works	26,783	26,491
18	Victualling	33,968	33,605
20	Hospitals, &c.	16,780	16,553
	MATÉRIEL.		
	Stores and Supplies—		
3	Admiralty	9,560	9,560
28	Shipbuilding in Dockyards	1,533,880	1,576,000
33, 34	Shipbuilding by contract	2,100,000	1,989,600
30, 32	Fitting for sea; maintenance; repairs	590,092	624,000
	Carried forward	£8,356,304	£8,223,826

Cap. in Estimates, 1905.	Heads of Expenditure.	Credits voted for 1905.	Credits voted for 1904.
		£	£
	Brought forward - -	8,356,304	8,223,826
	MATÉRIEL—*continued.*		
	Stores and Supplies—*continued.*		
25, 26	Repairs, conversions, &c., in dockyards and by contract	618,784	628,480
36, 38 40	Armaments; new guns and conversions; Powder, ammunition, repairs, tools, &c.	888,904	871,119
42, 43	Torpedoes	178,021	179,421
46	Works; new and large alterations. .	93,124	94,576
47	Ditto; deepening of the Charente .	6,000	10,000
44, 48	Ditto; supplementary for defence of military ports	679,518	667,517
49, 50	Works; repairs	65,167	65,967
4	Hydrographic Service	15,320	15,320
16	Clothing, &c.	126,241	128,839
17, 19	Victualling	839,172	809,971
21	Hospitals, &c.	76,504	77,704
51, 52	Fuel, lighting, office furniture, printing, &c.	40,024	40,484
	MISCELLANEOUS.		
22, 23	Travelling expenses, freight, allowance for lodgings, &c.	177,680	142,400
53	Charitable and subscriptions . . .	41,353	37,717
54	Pay of Reserve Officers	29,156	29,156
56, 57	Fisheries and Commerce (materials for protection, &c.)	15,660	13,660
58	Pensions	493,000	472,981
59	Secret Service	4,000	4,000
	Total . .	£12,743,932	£12,513,138

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1905.—BUILDING IN DOCKYARDS.

Class.	Names of Ships.	Where Building.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Probable Expenditure in 1905.
					£	£
Battleships. . .	République . .	Brest. .	1901	1906	1,462,009	237,362
	Démocratie . .	,, . .	1903	1907	1,461,901	342,995
Armoured Cruisers, First-class . .	Léon Gambetta .	Brest. .	1901	1903	1,177,667	45,104
	Jules Ferry . .	Cherbourg	1901	1906	1,155,915	100,668
	Victor Hugo . .	Lorient .	1903	1906	1,209,487	251,588
	Jules Michelet .	,, .	1902	1907	1,233,709	322,072
	Edgard Quinet (ex C. 16) . . .	Brest. .	1905	1908	1,247,035	363,691
	Waldeck Rousseau (ex C. 17) . .	Lorient .	1906	1908	1,226,593	664
	Dupetit-Thouars .	Toulon .	1899	1905	937,710	70,108
Torpedo-gunboats and Destroyers .	Stylet	Rochefort	1902	1906	56,817	18,928
	Tromblon . . .	,,	1902	1906	56,831	19,509
	Pierrier . . .	,,	1903	1905	56,791	24,117
	Obusier . . .	,,	1903	1906	60,543	33,374
	Mortier . . .	,,	1903	1906	60,545	29,918
	Carquois (ex M. 38)	,,	1904	1906	61,127	27,775
	Trident (ex M. 39)	,,	1904	1906	61,127	25,514
	M. 40	,,	1905	1907	57,415	13,252
	M. 41	,,	1905	1907	57,415	12,160
	M. 42	,,	1905	1907	57,417	9,085
	M. 43	,,	1905	1907	57,415	6,640
First-class Torpedo-boats . .	P. 138 and P. 139.	Toulon .	1904	1905	40,338	30,240
Submarines and Submersibles .	Y.	,,	1902	1905	39,115	1,438
	Aigrette . . .	,,	1902	1904	30,583	1,718
	Cigogne . . .	,,	1903	1904	30,583	1,718
	Omega (ex Q. 40)	,,	1903	1906	55,144	20,953
	Émeraude (ex Q. 41)	Cherbourg	1903	1905	69,848	19,539
	Opale (ex Q. 42).	,,	1903	1905	69,868	20,267
	Rubis (ex Q. 43).	,,	1903	1905	69,868	20,779
	Saphir (ex Q. 44).	Toulon .	1903	1905	69,868	18,644
	Topaze (ex Q. 45).	,,	1903	1905	69,868	20,686
	Turquoise (ex Q. 46)	,,	1903	1905	69,868	22,907
	Q. 47 to Q. 60 (14)	Various	1904–5	1906–7	978,133	259,369
Total building in Dockyards, 1905..				.. £	13,348,553	2,392,780

PROGRAMME OF NEW CONSTRUCTION, TO BE CONTINUED OR UNDERTAKEN IN 1905.—BUILDING BY CONTRACT.

Class.	Names of Ships.	Where Building.	Date of Commencement.	Proposed Date of Completion.	Estimated Cost.	Probable Expenditure in 1905.
					£	£
Battleships	Patrie	La Seyne—Toulon	1901	1907	1,612,964	293,170
	Liberté	St. Nazaire—Brest	1902	1907	1,678,478	352,947
	Justice	La Seyne—Toulon	1902	1907	1,679,029	423,880
	Vérité	Bordeaux—Brest	1902	1908	1,694,091	448,218
Armoured Cruisers First-class	Ernest Renan	St. Nazaire-Cherbourg	1903	1908	1,444,434	348,046
Torpedo Boat Destroyers	Claymore	Le Havre—Cherbourg	1903	1906	74,911	29,903
First-class Torpedo Boats	282 to 292 (11)	Various	1903	1904	198,970	19,804
	294 to 317 (24)	"	1903	1905-6	420,911	146,280
	P. 139 to P. 188 (50)	"	1904	—	887,821	359,955
	P. 190 to P. 209 (20)	"	1905	—	355,130	20,000
School of Pilotage	Chamois	..	1904	1906	26,179	10,179
Total building by contract, 1905					£10,102,921	2,452,432

German Navy Estimates, 1905.

(Converted at £1 = 20·43 marks.)

ORDINARY PERMANENT ESTIMATES.

——	Granted for the financial year 1905.	Granted for the financial year 1904.
	£	£
Imperial Navy Office	80,762	78,015
Admiralty Staff	11,647	9,733
Look-out Stations and Observatories	17,607	17,108
Station Superintendencies	23,061	21,166
Administration of Justice	6,961	5,708
Naval Chaplains and Garrison Schools	5,334	5,345
Navy Pay	1,188,225	1,084,516
Maintenance of Ships in Commission	1,299,299	1,271,258
Victualling	85,323	84,760
Clothing	19,400	18,481
Garrison Works and Administration	67,359	64,915
Lodging Allowance	180,896	164,885
Medical Department	89,460	80,634
Travelling Expenses, Freight Charges, &c.	161,380	159,080
Training Establishments	19,783	17,826
Maintenance of Fleet and Docks	1,292,975	1,234,548
Ordnance and Fortification	454,158	411,292
Accountants' Department	35,958	34,265
Pilotage, Coastguard, and Surveying Service	33,090	31,680
Miscellaneous Expenses	64,376	61,390
Total of Ordinary Permanent Estimates carried to next page £	5,137,060	4,856,605
Administration of Kiau-chau Protectorate	4,717	4,406
	5,141,777	4,861,011

SPECIAL ORDINARY ESTIMATES.

Shipbuilding Programme for the Financial Year 1905.

For the Construction of—

	£
Battleship Preussen (K), 4th and final instalment	115,027
" Hessen (L) " "	115,027
Alteration of battleships of the Brandenburg class (additional)	84,192
Battleship Lothringen (M), 3rd instalment	227,606
" Deutschland (N), "	227,606
Large cruiser Yorck (Ersatz Deutschland), 3rd and final instalment	257,954
Small cruiser München (M), 3rd and final instalment	53,353
" Lübeck (Ersatz Merkur), 3rd and final instalment	53,353
Battleship O, 2nd instalment	296,133
" P, "	296,133
Large cruiser C, "	246,206
Small cruiser N, "	119,187
" Ersatz Alexandrine, 2nd instalment	119,187
" Ersatz Meteor, "	119,187
Battleship Q, 1st instalment	127,263
" R, "	127,263
Large cruiser D, "	156,632
Small cruiser O, "	59,961
" Ersatz Wacht, 1st instalment	59,961
" Ersatz Blitz, "	59,961
One Tender, and one Surveying Vessel	41,603
Steamer for laying mines, 1st instalment	58,737
One Torpedo-boat Division, 2nd and final instalment	119,432
One " " 1st instalment	151,742
Experiments with designs for Submarines	73,422
Total	£3,366,128

SUMMARY.

	Granted for the financial year 1905.	Granted for the financial year 1904.
	£	£
Ordinary Permanent Estimates	5,137,060	4,856,605
New Construction	3,366,128	3,388,888
Armaments, Torpedoes, and Mines	1,605,042	1,258,247
Other items	329,880	290,013
Extraordinary Expenditure	986,735	774,350
Total £	11,424,845	10,568,103

Italian Navy Estimates, 1905-1906.

FINANCIAL YEAR 1ST JULY, 1905, TO 30TH JUNE, 1906.

(Converted at £1 = 25 lire.)

——	Proposed for 1905–1906.	Revised Estimates, 1904–1905.
ORDINARY EXPENDITURE—GENERAL EXPENSES.	£	£
Admiralty	97,656	61,440
" *Travelling Expenses*	..	24,600
Pensions	241,200	233,200
Expenditure on various services connected with the Mercantile Marine	391,974	381,373
Total £	730,830	700,613
EXPENDITURE FOR NAVAL SERVICES.	£	£
General Staff of the Navy	138,760	146,400
Corps of Constructors	53,340	54,040
Medical Service	27,384	27,600
Commissariat Service	32,720	33,160
Pay of Officers, and Wages of Men	514,840	520,800
Gratuities, &c.	84,000	95,760
Forts—*Personnel*	15,000	14,400
Telegraph Service—*Personnel*	8,200	10,380
" " *Matériel*	11,600	11,520
Police (Dockyards)	11,280	11,280
Salaries and Office Expenses	7,120	..
Barracks, Maintenance and Lighting, etc.	8,280	8,280
Rents and Water Royalties	2,980	..
Ships fitting out, &c.	261,400	242,800
Fuel and Stores, for Ships in Commission	320,000	308,000
Victualling	347,200	344,000
Hospital Services	22,000	21,920
Honorary Distinctions	..	600
Training Establishments	..	12,884
Naval Academy and Engineering School	15,045	2,160
Scientific Services—*Personnel*	1,354	1,587
" " *Matériel*	9,900	10,280
Workshops, Fortifications, and Stores—*Personnel*	60,632	63,992
Technical Department (Civil)—*Personnel*	37,476	56,637
Naval Constructors	21,600	..
Law Charges	1,280	1,280
Transport of Materials	4,720	5,000
Works Department—Repairs	96,400	100,000
Fuel and Stores, Machines, Tools, and Plant for maintenance of Ships; Materials and Labour	..	208,000
Plant, Machinery and Tools; Reconstruction and maintenance of Workshops; Materials and Labour	112,000	..
Fuel and Stores for Shore Establishments	150,000	..
Materials for repair of existing Ships	..	221,520
Labour for maintenance of Hulls and Machinery	..	192,000
Materials for maintenance of existing Ships—Armaments	..	153,040
Labour for construction and repair of Armaments	..	120,921
Construction of New Ships	..	848,000
Labour for construction and maintenance of Hulls, Machinery and Armaments	533,320	..
Carried forward £	2,909,831	3,848,241

The headings in last year's Estimates which do not occur in the Estimates for 1905-6 are given in Italics. (See Note, p. 493.)

	Proposed for 1905–1906.	Revised Estimates, 1904–1905.
	£	£
Brought forward	2,909,831	3,848,241
Materials for new construction and maintenance of existing Ships	900,000	..
Sundry expenses—*Personnel*	36,000	..
(The Estimates for 1905-6 provide for the continuation of the battleships Vittorio Emanuele, Regina Elena, Roma, and Napoli; the new cruiser A, of 10,000, at Castellamare; the laying down of cruiser B, of the same tonnage; the completion of the submersible Glauco, and the continuation of the submersibles Squalo, Narvalo, Otaria, and Tricheco, at Venice; the continuation of 14 first-class torpedo boats by the three firms of Odero, Pattison, and Schichau, of 12 other first-class torpedo boats laid down in 1904-5, and of one building at Spezia; the laying down of four torpedo boats destroyers; the construction and fitting of two lake gunboats; the fitting and construction of various auxiliary vessels.)		
Guns, Torpedoes and Small Arms	108,000	104,000
Total . . . £	3,953,831	3,952,241

EXTRAORDINARY EXPENDITURE.

	£	£
Temporary Civil Staff, in course of reduction	16,400	..
General Expenses and Half Pay	600	1,393
Expenditure on New Construction	104,493	169,752
Coast Defence and Fortifications	12,000	8,000
Torpedoes	24,000	8,000
Total . . . £	157,493	187,145

SUMMARY.

	£	£
Ordinary Expenditure—General Expenses	730,830	700,613
Expenditure for Naval Services	3,953,831	3,952,241
Extraordinary Expenditure	157,493	187,145
Depreciation of Ships in Commission	140,000	140,000
Rent of Lands occupied by Government	107,724	107,643
Grand Total . . £	5,089,878	5,087,612

In a note prefixed to the Estimates for 1905-6 it is explained that, with a view to simplification, and in order to enable Parliament to exercise a more effective control over expenditure, considerable changes have been made in the distribution of the various items, those of a similar class being grouped together. The total Ordinary Expenditure is thus increased, while Extraordinary Expenditure is diminished. The cost of labour has been brought under one head, and the distinction between expenditure on *matériel* for shipbuilding and that for maintenance has been abolished. The headings in last year's Estimates which do not occur in the Estimates for 1905-6 are given in Italics.

Russian Navy Estimates, 1905.

(Converted at £1 = 9·6 Roubles)

Heads of Expenditure.	1905.	1904.
	£	£
Central and Ports Administration	271,142	271,328
Educational	137,337	123,459
Medical	161,538	154,812
Pay of Officers and Men	752,929	752,502
Victualling	191,042	172,426
Clothing	377,188	339,235
Expenses of Ships in Commission	2,387,500	2,236,525
Hydrographic Department	119,058	114,172
Naval Armaments and Electric Lighting	1,579,713	1,253,362
New Construction and Repairs	4,069,703	4,035,776
Admiralty Yards and Workshops	669,895	556,676
Buildings, Rents, and Repairs	530,207	509,276
Travelling Expenses and Despatches	98,958	98,958
Retired Pay	66,266	64,318
Miscellaneous Expenses	221,486	283,875
Improvement of Naval Ports	470,400	709,133*
Expenditure on account of Next Year's Estimates	45,330	39,763
Total £	12,149,692	11,715,596

* The Estimates published a year ago for 1904 gave £829,206 as the amount for the improvement of Naval Ports, viz.:—Port Imperator, Alexander III., Libau, Vladivostock, and Port Arthur.

United States Navy Estimates, 1905–6.

(Converted at £1 = $4·8665, being par, as adopted by Congress.)

Objects of Expenditure and Appropriation.	Appropriated for year ending June 30, 1905.	Estimates for year ending June 30, 1906.	Appropriated for year ending June 30, 1906.
	£	£	£
Pay of the Navy . . .	3,970,840	4,109,730	3,596,013
Pay, Miscellaneous . . .	123,292	123,292	123,292
Contingent, Navy . . .	13,357	13,357	13,357
Bureau of Navigation . .	279,467	365,714	365,755
" Ordnance . . .	755,513	1,048,701	862,285
" Equipment. . .	1,335,258	1,381,738	1,268,680
" Yards and Docks .	187,772	203,757	190,577
Public Works under Bureau of Yards and Docks . . .	1,284,100	1,389,916	645,166
Public Works under Secretary of Navy (Naval Academy) . .	617,085	399,671	164,389
Public Works under Bureau of Navigation (Training Stations and War College . . .	8,451	32,241	19,419
Public Works under Bureau of Ordnance	48,248	103,680	17,712
Public Works under Bureau of Equipment	1,027	2,055	2,055
Public Works under Bureau of Medicine and Surgery . .	4,110	56,097	4,110
Bureau of Medicine and Surgery.	77,057	79,112	79,112
" Supplies and Accounts	1,069,338	1,209,069	1,209,069
" Construction and Repair	1,694,405	1,728,146	1,638,307
" Steam Engineering .	703,360	888,260	817,404
Naval Academy . . .	67,422	71,853	71,648
Marine Corps	749,814	938,023	836,203
" Public Works .	34,727	90,619	10,275
Increase of Navy:— Construction and Machinery .	4,074,151	6,249,015	4,810,609
Armour and Armament . .	2,465,838	2,876,811	3,698,757
Equipment	—	173,636	173,636
Total . . .	£19,564,632	£23,534,493	£20,617,830

THE CONSTITUTION OF THE BOARD OF ADMIRALTY.

The following "Copy of an Order in Council, dated 10th August, 1904, showing designations of the various members of, and secretaries to, the Board of Admiralty, and the definition of the business to be assigned to them," was issued as a Parliamentary paper [Cd. 2416] :—

At the Court at Buckingham Palace.

The 10th day of August, 1904 :—

Present,

The King's Most Excellent Majesty in Council.

Whereas there was this day read at the Board a Memorial from the Right Honourable the Lords Commissioners of the Admiralty, dated the 6th day of August, 1904, in the words following, viz. :—

"Whereas the constitution and business of the Board of Admiralty are set forth in the Orders in Council of Her late Majesty bearing date the nineteenth day of March one thousand eight hundred and seventy-two, and the tenth day of March one thousand eight hundred and eighty-two:

"And whereas we consider it desirable that the above Orders in Council shall be rescinded, and that the designations of the various Members of and Secretaries to the Board, and the definition of the business to be assigned to them shall be as set forth herein, namely—

"I. The Members of the Board shall be—

The First Lord of the Admiralty,
The First Sea Lord,
The Second Sea Lord,
The Third Sea Lord and Controller,
The Fourth Sea Lord,
The Civil Lord.

"II. There shall be two Secretaries to be called :—

The Parliamentary and Financial Secretary,
The Permanent Secretary.

"III. The First Lord shall be responsible to Your Majesty and to Parliament for all the business of the Admiralty, the business to be transacted as follows :—

"(*a*) The First Sea Lord, the Second Sea Lord, and the Fourth Sea Lord to be responsible to the First Lord of the Admiralty for the

administration of so much of the general business connected with Your Majesty's Navy, and with the movement and condition of Your Majesty's Fleet and with the *personnel* of that Fleet, as shall be assigned to them or each of them, from time to time, by the First Lord.

"(*b*) The Third Sea Lord and Controller to be responsible to the First Lord for the administration of so much of the business relating to the *matériel* of Your Majesty's Navy as shall from time to time be assigned to him by the First Lord.

"(*c*) The Parliamentary and Financial Secretary to be responsible to the First Lord for the Finance of the Department and for so much of the other business of the Admiralty as shall from time to time be assigned to him by the First Lord.

"(*d*) The Civil Lord and the Permanent Secretary to have such duties as shall from time to time be assigned to them by the First Lord.

"We beg leave to recommend that Your Majesty may be graciously pleased by Your Order in Council to sanction this proposal."

His Majesty, having taken the said Memorial into consideration, was pleased, by and with the advice of His Privy Council, to approve of what is therein proposed. And the Right Honourable the Lords Commissioners of the Admiralty are to give the necessary directions herein accordingly. A. W. FITZROY.

THE DISTRIBUTION OF BUSINESS.

A statement showing the present distribution of business between the various members of the Board of Admiralty, dated October 20, 1904, and that which it superseded, dated January 1, 1904, has also been issued as a Parliamentary paper [Cd. 2417]. The following tabular statement shows the present distribution as arranged on October 20, 1904:—

First Lord	General direction of all business.
First Sea Lord	Organisation for war and distribution of the Fleet.
Second Sea Lord	*Personnel.*
Third Sea Lord and Controller . .	*Matériel.*
Fourth Sea Lord	Supplies and transport.
Civil Lord	Works, buildings, and Greenwich Hospital.
Parliamentary Secretary . .	Finance.
Permanent Secretary . . .	Admiralty business.

A more detailed statement which follows the above table in the Parliamentary paper shows that the principal changes in the distribution of business assigned to each member of the Board are as follows:—

The First Lord is now relieved of the duty of making some minor appointments, such as commanders to the Coast Guard, but has added to his duties the appointment of the Chaplain of the Fleet and the entry of chaplains and naval instructors. He has also relinquished the business connected with the Mersey Conservancy. Otherwise his business remains as before.

The First Sea Lord is now charged with the most important and responsible work of preparing for war. He is to advise on all large questions of naval policy and maritime warfare. He will be responsible for the fighting and sea-going efficiency of the Fleet, its organisation and mobilisation; the distribution and movements of all ships in commission or in Fleet Reserve. He will also be in control of the Intelligence, Hydrographical, and Naval Ordnance Departments. On the other hand, all matters connected with the details of *personnel*, such as the appointments of commanders under captains, minor questions of discipline, the signalling department, and leave to officers and men previously in his office, have been transferred to the Second Sea Lord.

The Second Sea Lord is now responsible for all questions relating to the *personnel*, including the manning of the Fleet, the service and appointments of officers (except those marked to the First Lord), the Royal Marines, the Coast Guard and Reserve forces, the hospitals, barracks, training establishments, and educational departments. His duties have thus been considerably increased, some of the work which hitherto fell to the First Sea Lord now devolving upon him.

The business of the Third Sea Lord and Controller of the Navy has not undergone any great alteration, but he has been relieved of certain extraneous work which was not directly connected with his office. He is charged with the administration of the dockyards and the control of the departments of the Director of Naval Construction, the Engineer-in-Chief, the Director of Dockyards, and the Superintendent of Contract Work, Naval Stores, and Expense Accounts. He deals also with naval ordnance questions which affect the construction of ships or involve structural alterations in weights, and with inventions relating to ships, machinery, etc.

The Fourth Sea Lord deals with the transport service, the coaling and victualling of the Fleet, the provision and maintenance of naval and other stores for the use of the Fleet, with all questions relating to pay, half-pay, and pensions, with medals, uniform regulations,

naval prisons, and with matters arising out of salvage. To these are now added questions connected with collisions, but otherwise his duties do not appear to have been changed.

The departments of the Civil Lord, the Parliamentary Secretary, and the Permanent Secretary do not appear to be affected by the new order, to which, however, the following note, which was not attached to the order of January 1, 1904, is appended:—

"It is to be understood that in any matter of great importance the First Sea Lord is always to be consulted by the other Sea Lords the Civil Lord, and the Parliamentary or Permanent Secretary, and he will refer to the First Lord for any further action considered necessary, such as, for instance, bringing the matter formally before the Board. It is of course understood that all members of the Board will communicate direct with the First Lord in accordance with immemorial custom whenever they wish to do so."

THE DOGGER BANK INCIDENT.

REPORT OF THE COMMISSIONERS APPOINTED IN CONFORMITY WITH ARTICLE 6 OF THE ST. PETERSBURG DECLARATION OF NOVEMBER 12 (25), 1904.

[TRANSLATION.]

1. The Commissioners, after minute and prolonged examination of the *ensemble* of the facts that have come to their knowledge concerning the incidents submitted to them for investigation by the St. Petersburg declaration of November 12 (25), 1904, have in this report proceeded to give an analytic statement of those facts in their logical order.

In communicating the principal opinions of the Commission on each important or decisive point of this summary *exposé,* they believe that they have thrown sufficient light upon the causes and the consequences of the incident in question, and at the same time upon the responsibilities resulting therefrom.

2. On October 7 (20), 1904, the second Russian squadron of the Pacific Fleet, under the chief command of Vice-Admiral Aide-de-Camp General Rozhdestvensky, anchored near Cape Skagen with the intention of taking in coal before continuing its voyage to the Far East.

It appears, according to the deposition made, that from the time when the squadron left the roadstead of Reval, Admiral Rozhdestvensky had caused the vessels under his command to adopt minute precautions, with the object of placing them fully in a position to repel an attack by torpedo-boats during the night, either at sea or when anchored.

These precautions seemed to be justified by the information frequently sent by the agents of the Imperial Government respecting hostile attempts that were to be apprehended, and which in all probability would take the form of attacks by torpedo-boats.

Furthermore, during his stay at Skagen, Admiral Rozhdestvensky

had been informed of the presence of suspicious vessels off the Norwegian coast. Besides, he had learned from the captain of the transport Bakan, who had come from the north, that on the night before he had seen four torpedo-boats, which had only a single light at the masthead.

This news caused the Admiral to leave twenty-four hours earlier than he had intended.

3. Consequently each of the six distinct sections of the squadron steamed off separately in turn, and reached the North Sea independently of each other in the order mentioned in Admiral Rozhdestvensky's report; this general officer commanding in person the last section, composed of the four new battleships, Prince Suvaroff, Emperor Alexander III., Borodino, Orel, and the transport Anadyr.

This section left Skagen at 10 P.M. on October 7 (20).

The first two sections were ordered to proceed at a speed of 12 knots and the following sections at 10 knots.

4. Between 1.30 and 4.15 on the following afternoon, October 8 (21) all the sections of the squadron were passed in succession by the English steamer Zero, the captain of which vessel examined the different units closely enough for them to be recognised from his description of them. Moreover, the results of his observations are in general agreement with the indications given in Admiral Rozhdestvensky's report.

5. The last vessel passed by the Zero was the Kamchatka, according to the description which he (the captain of the Zero) gave of her.

This transport, which at first formed part of the same group as the Dmitri Donskoi and the Aurora, was, therefore, at the time alone and about ten miles behind the squadron, having been obliged to slacken speed owing to a damaged engine.

This accidental delay was perhaps incidentally the cause of the subsequent events.

6. As a matter of fact, towards eight o'clock in the evening this transport met the Swedish vessel Aldebaran and other unknown ships, which she fired upon, doubtless owing to the apprehensions aroused in the momentary circumstances by her isolation, the damage to her engine, and her slight fighting value.

However this may be, at 8.45 P.M. the captain of the Kamchatka despatched to his commander-in-chief by wireless telegraphy the statement respecting this meeting that he was "attacked on all sides by torpedo-boats."

7. In order to understand the influence which this news might have had upon the subsequent decisions of Admiral Rozhdestvensky

it must be remembered that in his anticipations the attacking torpedo-boats whose presence had thus been announced to him, rightly or wrongly, as being some fifty miles behind the section of the ships under his command, might overtake him towards one o'clock in the morning in order to attack him in his turn.

This information decided Admiral Rozhdestvensky to signal to his ships towards ten o'clock at night to redouble their vigilance and to expect an attack from torpedo-boats.

8. On board the Suvaroff the Admiral had deemed it indispensable that one of the two superior officers of his staff should be on duty on the commander's bridge during the night, in order to superintend in his stead the progress of the squadron, and let him know immediately should any incident occur.

Moreover, on board all the ships the permanent orders of the Admiral prescribed that the chief officer on duty was authorised to open fire in case of a manifest and imminent attack of torpedo-boats. If the attack were made from ahead he was to do so on his own initiative, and in the contrary case, much less pressing, he was to refer to his commanding officer.

With regard to these orders, the majority of the Commissioners considered that they involved nothing excessive in time of war and particularly in the circumstances which Admiral Rozhdestvensky had every reason to consider very alarming in view of the impossibility in which he found himself of verifying the accuracy of the warnings that he had received from the agents of his Government.

9. Towards one o'clock in the morning on October 9 (22), 1904, the night was semi-obscure, somewhat overshadowed by a slight and low mist. The moon only showed itself at intervals through the clouds. The wind blew moderately from the south-east, raising a long swell, which made the vessels roll 5 degrees on either side.

The course followed by the squadron towards the south-west necessarily led the last two sections, as was eventually proved, to pass in the neighbourhood of the habitual fishing-ground of the flotilla of the Hull fishing-boats, consisting of some thirty of these small steamers and covering an area of some miles.

It results from the consistent depositions of the British witnesses that all these boats carried their regulation lights and trawled according to their customary rules under the lead of their "admiral," and pursuant to the indications conveyed by conventional rockets.

10. According to communications received by wireless telegraphy nothing unusual had been signalled by the sections which preceded that of Admiral Rozhdestvensky in traversing these regions.

It subsequently transpired that, notably, Admiral Fölkersam,

having been led to skirt the flotilla on the north, very closely examined the nearest trawlers with his electric searchlights, and having thus recognised them as inoffensive, quietly proceeded on his way.

11. It was shortly afterwards that the last section of the Fleet, led by the Suvaroff, flying Admiral Rozhdestvensky's flag, arrived in its turn near the trawlers' fishing-ground. The course taken by this section carried it nearly into the midst of the flotilla of trawlers, which it would have been obliged to skirt, but to the southward, when the attention of the officers of the watch on the bridge of the Suvaroff was attracted by a green rocket, which put them on their guard.

This rocket, fired by the "admiral," indicated in reality, according to their conventions, that the trawlers were to trawl on the starboard side to windward.

Almost immediately after this first alarm, according to the depositions, the observers on the bridge of the Suvaroff who were scanning the horizon with night glasses, discovered "on the crest of the waves in the direction of the starboard cathead and at an approximate distance of eighteen or twenty cables" a vessel which appeared to them suspicious, because they saw no light and the vessel seemed to be coming straight towards them.

When the suspicious vessel was lighted up by a searchlight the men of the watch believed they detected a torpedo-boat going at high speed.

It was for these reasons that Admiral Rozhdestvensky opened fire on the unknown vessel.

The majority of the Commissioners express on this point the opinion that the responsibility for this act and the results of the cannonade sustained by the fishing flotilla rests with Admiral Rozhdestvensky.

12. Almost immediately after opening fire on the starboard side the Suvaroff perceived ahead of it a small boat barring its course, and was obliged to turn to port in order to avoid colliding with it. But this boat lighted up by a searchlight was recognised as a trawler.

In order to prevent the firing of the vessels from being directed against this inoffensive boat, the axis of the searchlight was immediately raised 45 degrees.

Thereupon the Admiral signalled to the squadron the order "Not to fire on the trawlers."

But while the searchlight illuminated this fishing-boat, according to the depositions of the witnesses, the observers on the Suvaroff

perceived on the port side another vessel which appeared to them suspicious because of its resemblance to that which they were firing on upon the starboard side.

Fire was at once opened on the second object, and was thus carried on from both sides, the line of ships having by a retrograde movement returned to its original course without having modified its speed.

13. In accordance with the permanent orders of the squadron the Admiral indicated the object on which the fire of the ships was to be directed by fixing the searchlights upon them, but as each ship swept the horizon in every direction around it with its own searchlights in order to guard against a surprise it was difficult to avoid confusion.

This firing, which lasted from ten to twelve minutes, caused serious damage to the trawlers' flotilla. It was thus that two men were killed, six others wounded, that the Crane sank, and that the Snipe, the Mino, the Moulmein, the Gull, and the Majestic suffered more or less serious damage.

On the other hand, the cruiser Aurora was hit by several projectiles.

The majority of the Commissioners declare that they lack precise elements to identify on what object the ships fired, but the Commissioners unanimously recognised that the boats of the flotilla committed no hostile act, and the majority of the Commissioners, being of opinion that there was no torpedo-boat either among the trawlers or on the spot, the fire opened by Admiral Rozhdestvensky was not justifiable.

The Russian Commissioner, not believing himself warranted in concurring in this opinion, stated his conviction that it is precisely the suspicious vessels that approached the Russian squadron for a hostile purpose that provoked the firing.

14. Respecting the real objects of this nocturnal firing, the fact that the Aurora was hit by a few projectiles of 47mm. and 75mm. would seem to be of a nature to give rise to the supposition that this cruiser, and perhaps even other Russian vessels, delayed on the track of the Suvaroff without that vessel being aware of it, may have provoked and attracted the first firing.

This error may have been caused by the fact that this ship seen from behind showed no visible light and owing to a nocturnal optical illusion experienced by the observers on the flagship.

In this connection the Commissioners declared that they lack important information enabling them to ascertain the reasons which brought about the continuation of the firing on the port side. In

presence of this conjecture certain distant trawlers might have been confounded with the original objects, and thus cannonaded directly. Others, on the contrary, may have been hit by a fire directed on objects further off.

These considerations, moreover, are not in contradiction with the impression of certain trawlers who, finding themselves hit by projectiles and remaining lit up in the radius of the searchlights, might have believed themselves to be the object of direct aim.

15. The duration of the firing on the starboard side, even from the standpoint of the Russian version, seemed to the majority of the Commissioners to have been longer than appeared necessary.

But this majority considered that it is not sufficiently informed, as has just been said, with regard to the continuation of the firing on the port side.

In any case, the Commissioners willingly acknowledge unanimously that Admiral Rozhdestvensky personally did all he could from beginning to end to prevent the trawlers, recognised as such, from being the objects of the fire of the squadron.

16. However that may be, the Dmitri Donskoi having eventually intimated her number, the Admiral decided to give the "stop fire" signal. The line of his ships then continued its route to the south-west without having stopped.

In this connection the Commissioners are unanimous in recognising that, after the circumstances which preceded the incident and those which gave rise thereto, there was at the closing of the firing sufficient uncertainty as to the danger incurred by the section of the ships to decide the Admiral to proceed on his way.

At the same time the majority of the Commissioners regret that it did not occur to Admiral Rozhdestvensky, while going through the Straits of Dover, to inform the authorities of the neighbouring maritime Powers that, having been led into open fire in the vicinity of a group of trawlers, those boats of unknown nationality required assistance.

17. The Commissioners, in closing this report, declare that their appreciations formulated therein are not in their spirit of a nature to cast any discredit either on the military value or the sentiments of humanity of Admiral Rozhdestvensky and of the *personnel* of his squadron.

Spaun.
Fournier.
Doubassow.
Lewis Beaumont.
Charles Henry Davis.

THE FLEET ON FOREIGN STATIONS.

The following letter was addressed to the *Times* and appeared on November 2nd, 1901. Most of the suggestions then made by Lord Brassey have been very closely followed in the new scheme of redistribution of the Fleet. Where this has been the case they are printed in italics. The only important exception is the establishment of the Atlantic Fleet based on Gibraltar as an independent command between the Mediterranean and Home commands. This blot in the new scheme of redistribution is dealt with in Chapter III.—Ed.

TO THE EDITOR OF THE "TIMES."

Sir,—I have recently been permitted to place before the readers of the *Times* a statement showing the strength of the British Navy in men and ships. The present communication deals with the distribution of out naval force. With a decided superiority in the number of sea-going ships in commission we should be well able to hold our own in every sea. *If, as it has been alleged, the Mediterranean Fleet is deficient in vessels of any type, they should be drawn from distant stations where our supremacy is unchallenged.* With these introductory remarks we may proceed to examine the position.

We may begin with the Mediterranean, combining the Channel Fleet as its western division with the squadron maintained in the Mediterranean as its eastern division. The following table, compiled without access to the latest official information, will be sufficiently accurate for the purpose in view:—

Table I.—Mediterranean and Black Sea (including British Channel Fleet).

	Great Britain.		France.		Russia.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
Battleships—						
First-class	18	269,000	6	69,729	2	24,960
Second-class	1	9,330	—	—	6	58,000
Coast defence	1	5,440	1	4,849	1	3,590
Cruisers—						
First-class	4	40,350	—	—	—	—
Second-class	6	81,400	5	22,958	—	—
Third-class	7	13,985	3	6,999	1	1,492
Torpedo gunboats	4	4,020	7	6,000	—	—

Destroyers: Great Britain, 14; France, 6.

Submarines: France, 2.

Auxiliary Vessels: Great Britain, Vulcan (torpedo depôt), Maine (hospital), Tyne (troopship). France: Foudre.

In the Mediterranean the superiority of the British Fleet to a two-Power standard in battleships is beyond question. We are weak in cruisers—not, indeed, as compared with other Powers, but in proportion to our strength in battleships. Our second-class cruisers of the latest type, 5,600 tons, should be large enough for service in an inland sea. It will be suggested later that some vessels of the class referred to could be detached from distant foreign stations for the reinforcement of the Fleet in the Mediterranean.

The Channel Fleet should be strengthened in cruisers. They should be of the most powerful type. The Navy Estimates of last Session provided for the completion in the year 1901–2 of six first-class cruisers, five being of the Cressy type.

To hold the Channel and defend our coasts and Home ports we have the Reserve Squadron, the port guardships, the Cruiser Squadron, the sea-going gunnery ships, and the instructional flotilla. The force available is shown in the following comparative table:—

TABLE II.

GREAT BRITAIN.—Reserve and Cruiser Squadrons, Port Guardships, Instructional Flotilla.
FRANCE.—Northern Squadron.
RUSSIA.—Baltic Fleet.

	Great Britain.		France.		Russia.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
Battleships	11	119,000	7	81,865	1	9,900
Armoured ships, Coast defence	2	12,400	4	26,423	8	27,000
Cruisers—						
Armoured—	4	22,400	2	11,160	—	—
First and Second-class.	4	22,950	3	15,000	—	—
Third-class	4	8,750	2	4,000	3	9,000
Torpedo Gun Vessels . .	15	11,960	1	958	—	—
Torpedo Vessels and Destroyers	24	—	12	—	—	—
Submarine	—	—	4	—	—	—

It is not the policy of Russia at the present time to maintain a naval force in northern waters outside the Baltic. The entire available strength in sea-going ships is concentrated in the China Seas.

In existing conditions our battleships in Home waters should be sufficient. It is an admitted weakness in our own Reserve Squadron, to some degree noticeable also in the French Northern Squadron, that it is constituted mainly of ships not of recent design. By judicious reconstruction our Admiral class could be strengthened by giving protection to the central battery, thus making them efficient for service on foreign stations, where few battleships of the most modern type will be found under the flags of other Powers. The Admiral type should be taken in hand as soon as the numerous

powerful battleships now in progress are completed and available for the reinforcement of our squadrons in European waters.

In cruisers on the Home station we have a decided superiority. It would be difficult to say how many would be sufficient for the defence of our vast commerce converging on the Channel. The sixteen armoured cruisers of the Monmouth class will give a much-needed addition to the Fleet.

On the China Station powerful squadrons have been formed under the British, French, and Russian flags.

The position is shown in the Table below:—

TABLE III.—CHINA STATION.

	Great Britain.		France.		Russia.	
	Ships.	Tons.	Ships.	Tons.	Ships.	Tons.
Battleships	5	60,000	Redoutable.	3,767	5	51,206
Cruisers—						
Armoured	2	11,200	—	—	6	55,623
First-class protected	4	41,550	2	16,391	—	—
Second-class	6	29,000	3	12,000	—	—
Third-class	3	7,295	—	—	2	2,500
Armoured Coast Defence Gunboats	—	—	2	3,500	2	3,000
Sloops	3	—	2	—	6	—
Gunboats	10	—	6	—	2	—
Destroyers	6	—	—	—	—	—
Despatch vessel	Alacrity		Troopships.		Icebreaker.	
Store ship	Humber		Mytho		Silatch	
Surveying ship	Waterwitch		Nile		Torpedo Gun Vessel.	
			Vinh-long		Gaidamak	

In the circumstances of the hour, our strength in Chinese waters is a question rather for the Cabinet than the Admiralty. It has been deemed necessary, in deference to political considerations, to bring up the British naval force to a level, approximately, with the combined strength of France and Russia. Influence with European Powers, in so far as it rests on armed forces, depends in a great degree, if not mainly, on the strength near home. In the late negotiations France, with only one second-class ironclad on the China Station, and the United States, with no battleship in those waters, have spoken with as much authority as Great Britain, although our flag was shown on five battleships of the most powerful type.

Having a continuous chain of fortified coaling stations, it is the less necessary in time of peace to weaken the British fleets in the Mediterranean and on the Home Station. The ships of foreign Powers are largely dependent on facilities only obtainable in British ports. For our own ships those facilities would in all circumstances be available. We have that exclusive advantage.

In the Atlantic, including the Cape, the North American, and the South-East Coast of America stations, Great Britain has a decided preponderance over the two-Power standard:—

TABLE IV.

	Great Britain.		France.	
	Ships.	Tons.	Ships.	Tons.
Armoured Ship	Monarch	8,845	—	—
Cruisers—				
First-class	2	15,400	Tage Isly	7,589 5,500
Second-class	6	26,800	2	7,587
Third-class	6	12,645	1	2,410
Sloops	5	4,520	—	—
Gunboats	7	5,430	—	—

While the war continues in South Africa, it will be the duty of the Admiralty to maintain a squadron on the Cape Station fully adequate to any emergency. *On the east coast of America the United States is the dominant and a friendly Power. Supervision of the fisheries on the coast of Newfoundland and the naval police of the West India Islands are the chief duties of our squadrons. Few vessels only, and chiefly of the smaller class, are required as a permanent force. Our flag may be shown from time to time in American waters and the Canadian ports by our Cruiser Squadron.*

For the training of officers and men, it can scarcely be claimed that the North American compares favourably with the Channel or Mediterranean or Cruiser Squadrons. If the south-east coast of America were included in the North American command the squadron might be reduced. The second-class cruisers Indefatigable and Tribune and the third-class cruisers Pallas, Proserpine, and Psyche would be a valuable addition to our Mediterranean Fleet. A squadron which would include the first-class cruiser Crescent, the second-class cruisers Cambrian and Charybdis, the third-class cruiser Barracouta, and four sloops should be fully equal to the ordinary peace duties of the American Station. It could be promptly reinforced.

Combining the Australian Station with the Pacific, our squadron is constituted as under:—

TABLE V.—PACIFIC (including Australia).

	Great Britain.		France.	
	Ships.	Tons.	Ships.	Tons.
Cruisers—				
Armoured	1	8,400	—	—
First-class	1	7,700	—	—
Second-class	2	8,600	Amiral Protet	4,065
Third-class	7	12,920	D'Estrées	2,500
Sloops	3	3,000	—	—
Torpedo gunboats	1	735	—	—
Gunboat	1	805	—	—

Our squadrons in the Pacific are our reserve for China. A strong representation of the Imperial Navy in Australia and at Vancouver fosters a patriotic sentiment, and so fulfils a political object of the highest importance. It does not appear desirable to reduce the present strength. On the contrary, our Australian Squadron should be reconstituted as recommended by Admiral Beaumont. *The third-class cruisers which form the bulk of the present squadron are too short to keep their speed against heavy seas. They should be lent to the Government of the Australian Commonwealth. As an instructional flotilla they would be useful for the training of the local Naval Reserve.* They would also be effective for harbour defence in case of attack by hostile cruisers on ports such as Brisbane, Melbourne, or Adelaide, situated on inland seas. The three second-class cruisers of the 5600 tons type now in the Reserve for the Home ports are available for commissioning for the Australian Station. Their length of 320 ft., as against the 265 ft. of the Mildura class, gives them a decided superiority as cruisers. Reconstituted as proposed, the Australian Squadron would include the first-class cruiser Royal Arthur, three modern second-class cruisers, to be increased as vessels become available, with masted sloops or first-class gunboats for the police of the islands.

It should shortly be possible to detach two or three of our best second-class cruisers from our large force in China to the Australian Squadron. As it has already been suggested, that squadron is a reserve for China. The French are making considerable reduction in their naval force in Chinese waters.

The fleet on the East India Station is shown in the following Table:

TABLE VI.—EAST INDIES.

—	Great Britain.		France.	
	Ships.	Tons.	Ships.	Tons.
Cruisers—				
Second Class . .	1	5,600	1	4,065
Third Class . . .	4	8,990	1	2,452
Gunboats	3	1,275	1	505

It would seem desirable to reduce the Imperial naval force on the East India Station to a Commodore's command. The fast third-class cruisers Pomone and Perseus are more suitable for the Mediterranean than the Tropics. They could be replaced, if necessary, with cruisers of a larger and earlier type, such as the third-class cruisers on the Australian Station, which are perhaps more efficient for the police of the seas in hot latitudes. The Indian Government should be

encouraged to strengthen their local navy. It already includes two armoured ships for the defence of Bombay Harbour, numerous gun-vessels, torpedo-boats, troop-ships, and other steamers.

The officers of the Indian Marine have the honour of being included in the British Navy List. The *esprit de corps* is keen. It would give sensible relief to the Imperial Navy if some portion of the trying duties on the coasts of Burma and the Persian Gulf were to be handed over to the Indian Marine, which should be placed under the command of a Rear-Admiral. Such an arrangement would give additional men for our European squadrons.

In peace we look to the Imperial Navy as essentially a training service. Training will be most thorough in powerful squadrons of exercise under close supervision on the part of the Admiralty. It is difficult to make it as perfect as we could wish in distant waters, in trying climates, and in the weariness of prolonged isolation. If we turn to political considerations it is certain that the nearer the force and the more often in evidence the deeper the impression which it produces. Witness the Jubilee review. The statistical position, if the phrase may be used, was a matter of common knowledge. It had produced no such impression, even on those best informed on naval matters, as did the array of ships at Spithead. *Our squadrons on those foreign stations, where the flags of other Powers are rarely seen, are maintained in deference to traditions handed down from the distant past, when the present facilities for communication by telegraph and steam were unknown, and when it was necessary to have a force on the spot to give protection to British interests in remote countries.* Under the changed conditions the necessity is no longer urgent—*pace* those lonely Consuls who would be made of sterner stuff than common human nature if they did not sometimes long for the pleasant companionship of a naval friend. For the defence of our coasts, our communications, and our commerce, we should be better prepared for every eventuality by a policy of closer concentration.

Before concluding, it seems proper to draw attention to the dispersion of the personnel of the British Navy in vessels useless for fighting purposes. While the number of vessels of all kinds built and building in the British Navy is 695, *in this year's published return of fleets of the Powers, as analysed by the American Naval Intelligence Department, we are credited with no more than* 477 *ships built and building, including ten vessels armed with muzzle-loading guns and the whole of our* 99 *torpedo-boats. The vessels excluded are old gunboats, training brigs, storeships, surveying ships, and school ships.*

In the opinion, therefore, of an impartial authority, we are maintaining some 218 *vessels, which, however useful some of them may be*

to assist the Navy, are useless for fighting purposes. It should be possible to reduce the number of non-combatant and harbour ships.

I have the honour to be, Sir, your obedient servant,

BRASSEY.

4, Great George Street, S.W.

P.S.—It may be desirable to append the names of warships actually in commission on those stations on which a reduction of strength has been proposed:—

ATLANTIC.

GREAT BRITAIN.

Armoured Ships	Guardship.—Monarch.
	Port Guardship.—Hotspur.
Cruisers ...	First Class.—Crescent, Gibraltar.
	Second Class.—Cambrian, Charybdis, Indefatigable, Tribune, Forte, Terpsichore.
	Third Class.—Barracouta, Blanche, Philomel, Pallas, Proserpine, Psyche.

FRANCE.

Cruisers ...	First Class.—Tage, Jurien de la Gravière.
	Second Class.—Isly.
	Third Class.—D'Estrées.

EAST INDIA STATION.

GREAT BRITAIN.

Cruisers ...	Second Class.—Highflyer.
	Third Class.—Cossack, Marathon, Perseus, Pomone.
Gunboats ...	Lapwing.
	Indian Navy.—Assaye, Plassy.

FRANCE.

Cruisers ...	Second Class.—Catinat.
	Third Class.—Infernet.
Gunboat ...	Scorpion.

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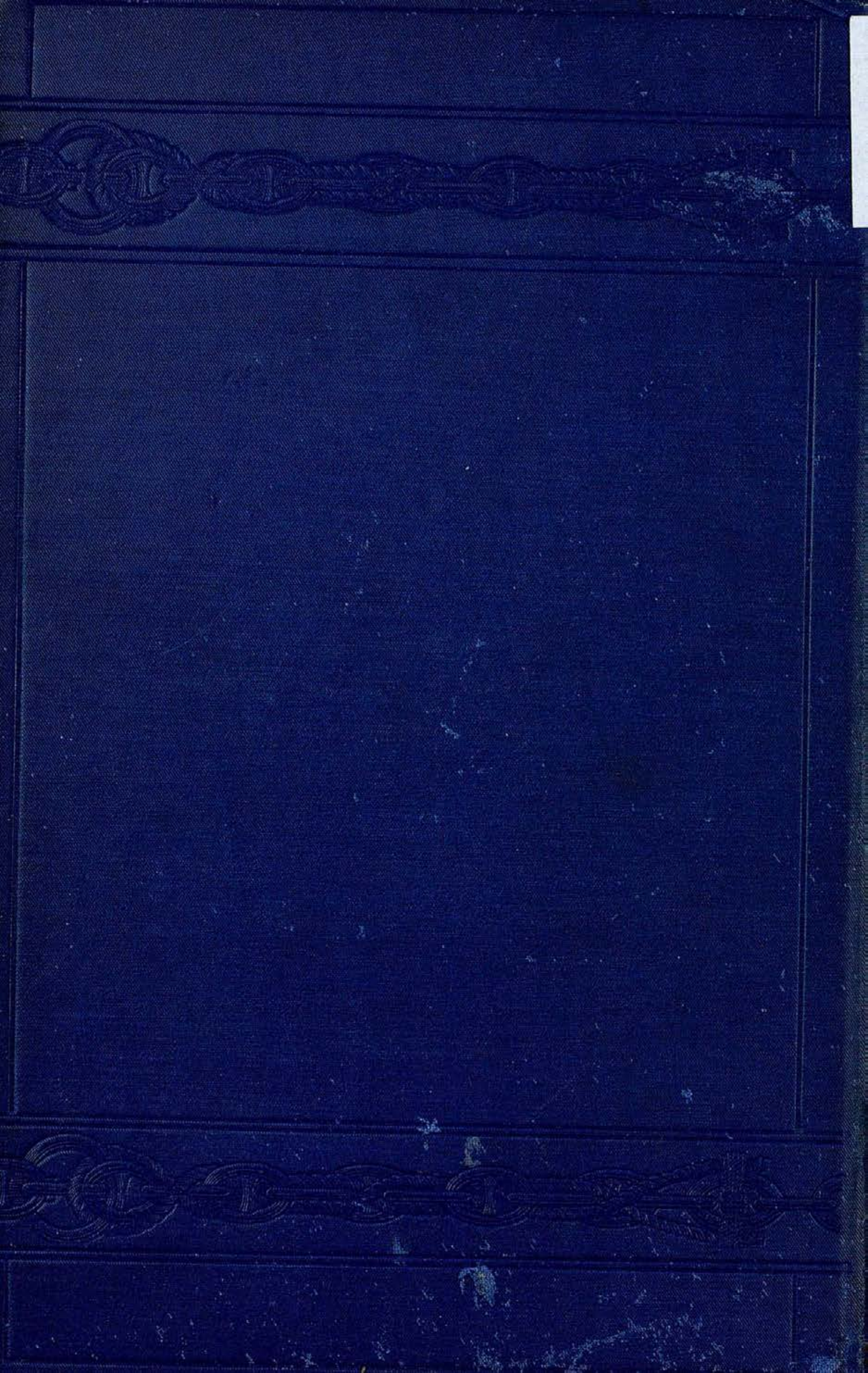
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